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VETERINARY MEDICINE

May 1935

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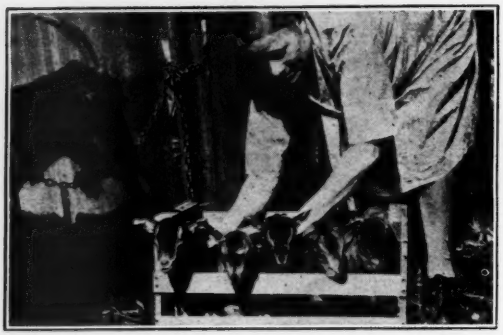
Junior FORT DODGE BIO-CHEMIC REVIEW

MAY 1935

CAMERA!



QUINTUPLETS—Publicity-seeking goat on Geneva, N. Y., farm brings five kids into world. Photo © International.

HELLO WORLD! — Bronx Zoo baby gets first peek at the great outdoors. Mother is also zoo-born. © Intl.

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Every veterinarian engaged in poultry practice should get acquainted with Fort Dodge's new Special Fowl Tablets (Blue). Try them.

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D. M. Campbell, Editor A. T. Kinsley, Associate Editor
H. J. Mostyn, R.K.O. Bldg., New York, Eastern Representative

Virchow took medicine from the field of imagination and placed it upon a scientific basis.

* * * *

The poultry disease problem is a challenge to the veterinary profession. Veterinarians are the only group with the fundamental training to handle poultry disease, and they have largely neglected it.—*Patterson.*

* * * *

There is considerable loss of pure-bred goats in New York State from acetonemia. There is a wide variation in the syndrome. In some cases, nervousness predominates, in some digestive disturbances and in some, paralysis.

* * * *

Although a veterinarian may be a "private practitioner," he is, nevertheless, a public officer with certain responsibilities to the state and his community. This is implied in the license given him to practice and is recognized in law.

* * * *

The physical examination of the udder is the basis upon which all information concerning mastitis is interpreted. The findings in the strip cup, the result of the alkalinity test and the report of the bacteriological examination, all must be hitched up with the physical examination of the udder before any or all of them mean anything specific enough upon which to act.

Rabies in dogs may be overlooked when complicated by distemper or fright disease.

* * * *

Puppies susceptible to distemper are prone to develop the disease following abdominal operations that invade the stomach or the intestinal canal.

* * * *

Theobald reports success in the removal of whipworms by performing a laparotomy and injecting one to two grains of a fine suspension of santonin in glycerin and water, directly into the cecum with a hypodermic syringe.

* * * *

Two per cent of the dogs used for instruction and in animal experimentation at the Northwestern Medical School, Chicago, are suffering from a pancreatic deficiency, due to fibrous degeneration of the pancreas. Less than one per cent of the dogs used by the school have diabetes.

* * * *

Prior to 1919, eighty per cent of the hundreds of stray dogs handled by the Department of Pharmacology of the Northwestern Medical School, Chicago, were affected with goitre. Since that date, only one per cent of such dogs have been so affected. No reason is known for the decrease in the incidence of goitre among stray dogs in Chicago, other than 1919 is the date since which table salt sold in the city has been iodized.

I know of no disease that lends itself so readily to a few simple measures for its control as does mastitis.—*Udall.*

Calves that have sucked cows affected with mastitis, are quite apt to have mastitis when first they freshen.—*Udall.*

The great obstacle to the diagnosis of mastitis is the mass of published assumption by men who never operated in this field.—*Udall.*

Stroking the escutcheon will usually induce urination in a cow. This is a convenient way to obtain a sample for analysis or for testing for acetonemia.

Mastitis is a chronic disease of the udder. Attacks termed acute mastitis, are simply exacerbations of the chronic disease which has probably existed for a considerable time. —*Udall.*

Any milk inspection, to be effective, must include three things: (1) regulations; (2) instruction, and (3) supervision of the inspection. None of these can be dispensed with.—*Udall.*

The strip cup is of inestimable value in the diagnosis of mastitis, yet it may reveal no clots in 50 consecutive cases of the disease. To condemn the strip cup, is to condemn the man who uses it.—*Udall.*

That a cow should shed streptococci in the milk before the clinician can detect fibrosis in the udder is a perfectly reasonable assumption, and the literature contains a vast mass of proclamations based upon it. Unfortunately, it is an assumption that is not true.—*Udall.*

Because so many of the ills of poultry are directly or indirectly due to errors of management, the veterinarian, to function effectively in the field of poultry disease control, must be thoroughly familiar with the problems of poultry handling.—*Patterson.*

High production has made disease the greatest problem of the poultry industry.—*Patterson.*

A surprising number of people think that a dog cannot digest starch. There is ample evidence, both practical and scientific, to the contrary.—*Dukes.*

Nutrition has such an important bearing on disease that it may be regarded as a new branch of medical and veterinary science.—*R. M. Bethke.*

In the control of stomach worms in sheep, the factor of nutrition is worth considering. A good diet is quite effective in preventing infestation.—*Wright.*

The donor should not be fed within four hours preceding blood transfusions in dogs, and for safety, the blood should be cross agglutinated.—*Ivy.*

Hyaline casts indicating a low grade nephritis, were found in the urine of a very high percentage of 35 apparently normal dogs, one to seven years of age. Many cases diagnosed as gastro-enteritis are no more nor less than cases of nephritis. The gastro-enteritis is a symptom and a result of the basic ailment.—*Theobald.*

Few realize the importance of normal saline injections in the treatment of gastro-enteritis in dogs. All grave cases of this ailment suffer from dehydration. I prefer to give the normal saline injection intravenously and to add to it, five per cent of glucose. The solution should be injected slowly. —*Theobald.*

The public health movement in the United States has borne good fruit. The veterinarian has demonstrated his ability to serve in public health work. The chief service that he can afford is the particular one for which he is trained—in the province of food inspection or control of disease transmissible from animals to man. The function of veterinary medicine is to contribute to the happiness and welfare of man.

Equine Encephalomyelitis

At the annual meeting of the Horse and Mule Association of America, December 5, 1934, a special committee was appointed to collect information on encephalomyelitis of horses. The members of the committee are: Director Thomas P. Cooper of the Kentucky Experiment Station, Admiral Cary T. Grayson of Washington, D. C., and Wayne Dinsmore, Secretary of the Horse and Mule Association of America. The committee reports in part as follows:

From information supplied by Dr. Mohler, it appears that the cause of the disease is a virus which cannot be seen or cultivated by any known methods; that it passes through bacteria retaining filters; that the virus which causes the western disease appears to differ in several respects from the virus which caused heavy losses in Delaware, Maryland, New Jersey and Virginia in 1933, and that the virus which has caused the disease in the East is the more virulent, with possibly greater fatalities.

It appears also, that sick animals may be in contact in the same lots, barns, or pastures, with healthy animals, without the latter contracting the disease from such direct contact; but that material from sick horses, sprayed with an atomizer into the nostrils of healthy ones, will transmit the disease in a high percentage of cases; that abrasions on the mouth or tongue also may be channels by which the virus gains entrance to healthy animals; that the mosquitos which infest the salt-water marshes in the tidewater areas of Delaware, Maryland, New Jersey and Virginia have been shown experimentally to be capable of carrying the disease from animal to animal, and that a certain kind of mosquito, not found generally in this country, has carried the virus of the Western disease from guinea pig to guinea pig in experiments, and also to horses.

Research thus far indicates that the virus is present in the blood for only a short time, at the onset of the disease, and soon attacks the brain and other nerve tissues, after which the virus is not found in the blood; hence, blood tests cannot be used to determine whether certain animals have, or have had, the disease, with any regularity. There is no evidence yet to determine whether animals that have had the disease and recovered may be carriers of the virus.

The fact that the disease appears during the late summer and fall and dies out after frost, adds force to the theory that insects such as mosquitos, ticks, or biting flies, may be among the agencies by which the disease is spread from one animal to another; but definite proof of precisely what insects, if any, are responsible, is lacking. Research in this field should be extended, as it seems probable that insect vectors have an important part in spreading the virus from animal to animal.

Preventive measures thus far have been:

1. The use of the live virus from affected animals, in small doses. This is highly dangerous, for while the mortality rate is not considerable, some do die, and those that are sick actually have the disease itself and may be instrumental in infecting healthy animals.
2. The use of dead virus, produced by preparing the brain tissue from diseased animals with formalin. This virus is dead and cannot cause the disease, but the tests thus far indicate that it does afford some degre of protection. Further tests are needed, however, before it can be produced commercially.
3. The use of anti-encephalomyelitis serum. Eventually it may be the best preventive.

Immunity against the same type of virus appears to be conferred following recovery, but the duration of such immunity is not definitely known. Animals recovered from the disease caused by one type of virus may become infected readily with the other type.

The committee found that progress is being made in the studies of the etiology and control of equine encephalomyelitis. Important research work into the nature of the disease, the mode of infection, and possible methods of prevention, is under way in:

1. The Bureau of Animal Industry of the U. S. D. A. under the direction of Dr. J. R. Mohler.
2. Experiment Stations of several states, especially Nevada and California. Other states are giving attention to the subject.
3. New Jersey, under the direction of Dr. C. Ten Broeck and M. H. Merrill, of the Animal Pathology Research of the Rockefeller Institute of Medical Research.

Thus a group of trained scientists are devoting much effort to the accumulation of information on the disease. Progress is being made and important contributions to our knowledge of the subject may be expected.

The committee concluded that the subject of equine encephalomyelitis, in the present stage, is one for research; that the disease is epizootic in character at times, and that no one can foretell when or where subsequent outbreaks may occur; that antiserum has been developed that is of some use in treatment; that the dead "vaccine" which is, as yet, in an experimental stage may eventually be the best preventive; and that there is no reason to believe that we can, as yet, undertake a campaign of eradication of the disease because we do not, as yet, know enough about it.

The committee decided also to keep in touch with all work as published and to keep all interested parties, including horsemen, informed of progress made.

Public Hearing on Dog Food Code

In the February issue of this magazine, there appeared an extended discussion of the plan proposed by the Dog Food Code Authority for enforcement of "reasonable definitions and reasonable standards of identity and biological value for canned dog food, necessary to prevent deception, fraud and unfair competition in the sale of canned dog food." It was stated that the plan proposed was so general in its terms as to permit almost anything in the way of improvement or of continuance in whole or part of the extremely objectionable practices of the present; that a remedy of the unsatisfactory conditions prevailing in the industry would, under this plan, depend wholly upon the good intentions and earnestness of the Code Authority.

Unfortunately the long delay of the Dog Food Manufacturers' Association in agreeing to any code, and the unconscionable delay of the Code Authority in submitting a plan, left more than a little doubt as to the latter's intentions. Many seemed to share these doubts including one member of the Code Authority, who demanded and obtained a public hearing in Washington, February 12, on the proposed standards and the plan for their enforcement. The general terms in which these documents were couched were objected to, strenuously, by most of those discussing them at the hearing and by none more than by official representatives of the NRA. The result was the Code Authority was directed to revise them extensively; making more specific practically all provisions as to standards.

This highly interesting meeting aroused the interest of newspapers and created considerable national attention because of the acknowledged abuses within the industry, many of which were first brought to light in VETERINARY MEDICINE.

The proposed standards on canned dog food were submitted by Attorney Charles Wesley Dunn, executive officer of the Dog Food Manufacturers' Association. Six of the seven members of the Code Authority had unconditionally approved the proposals. One member, P. M. Chappel, had insisted upon a full and complete interpretation and rewriting of the biological standards section in order, he explained: "to positively insure quality standards, honest labeling and truthful advertising." Mr. Chappel was the only member of the Code Authority present, the others were represented by Mr. Dunn. Assistant Deputy Administrator Richard S. Scott of the NRA presided at the hearing.

Mr. Dunn outlined the development of the dog food association since June, 1933. Regulation was necessary, he said, because the industry was in a state of injurious progressive demoralization which was undermining the integrity of the business and its economic stability. The need to establish standards was imperative in order to assure "fair competition and public protection." He recommended Prof. George R. Cowgill and Prof. William E. Anderson of the Department of Physiological Chemistry at Yale University, as members of the Scientific Council. Both of these gentlemen were present. Mr. Dunn explained that he and Doctor Cowgill encountered difficulty in setting the form of rules establishing definitions and standards, and could see no way out other than to write "general and comprehensive rules."

The hearing brought to light that there was some bitter opposition to most of these "general and comprehensive rules," because they were glittering generalities, artfully arranged that none but Mr. Dunn could understand. The hearing further developed that the present food and drugs act applies to dog food, but has not been actively enforced for want of sufficient appropriations. The fact was also brought out that two-thirds of the canned dog food manufacturers operate outside the jurisdiction of the federal meat inspection act.

In his statement, Mr. Chappel, a member of the Code Authority, said: "The dog food industry has developed into a racket. Ninety per cent of all the dog food made is unfit

for either humans or dogs." Very plain words, but no surprise to those familiar with the discussions of this subject that have appeared in VETERINARY MEDICINE during the past three years. It was interesting, however, to note the shock-effect of this frank statement on the dignified assemblage. He spoke of a canned food made with two parts corn hominy and one part cured lungs. He also repeated the incident when, at a meeting of the officials of the Dog Food Association, an eastern manufacturer of a cheap dog food (V. M., June, 1934) openly admitted that he made "a rotten food and knew it, and others are doing it." Continuing, the same speaker criticized the Code provision concerning biological standards. He advocated out-lawing dog food below a minimum nutritional and purity standard set by the Scientific Council; urged the adoption of three-generation albino rat tests, to be substantiated by feeding tests on dogs, and suggested complete rewriting of the biological standard section of the proposed plan so that anyone and everyone could understand it and know its exact requirements.

Mr. Rich, another dog food manufacturer, read a statement as follows: "Some unknowing people may question statements about unclean and diseased meats being used in dog foods . . . when canned dog foods whose principal ingredient is supposed to be meat sell regularly at retail for 5 cents a can? . . . when the can and label cost approximately 2 cents?" It was "an unclean subject" to talk about, said Mr. Rich, but approximately 90 per cent of this food is sold from grocery stores whose principal business is selling human food.

"Practically every dog food on the market has been claimed to be either 'a balanced ration' or 'clean, pure food.' But what proof or guarantee has the public?" To clinch his point in criticizing the very general terms and chances of slipshod enforcement, Mr. Rich quoted from the February issue of this magazine, and offered a practical plan whereby the nutritional findings of approved laboratories could be submitted to and passed upon by the Scientific Council.

Many unsupported claims from the advertising of various popular brands of canned dog food were read by Mr. Rich. Some amusement was apparent when the speaker read from a label and an advertisement published in the Long Island Press, January 24th, 1935—"Puro, Sanitarily prepared with pure water and cooked ready for use. Contains bran, wheat, meat scraps and assorted cereals." This dog food was offered six cans for 25 cents.

The Consumers' Advisory Board's review of the proposal offered by the Code Authority of the Dog Food Manufacturers' Association, read by Mr. Wilson, was eagerly awaited by everyone attending the hearing. Mr. Wilson saw no value in "the broad language" and "intents to prescribe" used in the proposal. It might "have some slight effect upon false, misleading and extravagant advertising"—*"but in no way does it scientifically establish a minimum standard of biological value."*

There could be no misunderstanding that kind of language! The plan was not acceptable to the Government. The wording the Code plan supposed to cover standards of biological value, of Section 4, Article III of the Dog Food Industry Code reads: "Section 4. Canned dog food shall have the biological and nutritive value (a) *represented by its dog food name* or designation; or (b) *alleged for it* upon its label or in its advertisements or otherwise in its sale."

The consumers' Advisory Board's crisp answer to these jokers was:

"The Consumers' Advisory Board sees in this section virtual evasion being accomplished under the guise of compliance with the Code provision requiring the establishment of standards of biological value."

The Board also emphasized the need of a new nomenclature which would definitely specify the various substances going into canned dog food, to prevent word juggling or misuse of terms. Some of these substances have peculiar pedigrees as all on the inside well know. The nomenclature in use today "is not only unfair but vicious" in its effect on "honest manufacturers packing quality products." The Board recommended

establishing definite procedure for the grading of biological and nutritive ratings, and non-standard labels on products that are below standard. They also objected to the personnel of the Scientific Council being subject to the approval of the Dog Food Manufacturers' Association.

Mr. Brosemer, pleading the cause of veterinarians and dog owners and breeders who want truth and honesty in dog foods, stated that 809,000,000 pounds of fresh junk of animal origin was available for canned dog foods during the average year. Emphasis was placed on the fact that it was *animal junk* and not meat, and that it returned around 7/16 of a cent per pound when it was used (where much of it rightfully belongs) in tankage and fertilizer, *but*, it brought two to three cents a pound when sold for use in canned dog foods.

Mr. Haddock of the Consumers Advisory Board asked Mr. Dunn if there was a definition of the term "dog food" in either the Food and Drugs Act or the Federal Meat Inspection Act. Mr. Dunn answered "no." Then it came to light that the philosophy of Mr. Dunn's interpretation was the designation "dog food"—in and by itself—"meant a complete dog food, therefore anything less than a complete dog food must have a descriptive label accordingly, to show its limited value."

Now we were getting somewhere, and brilliant Mr. Haddock set out to have things made clear. Questioning brought considerable explanation. For example: "There will be certain minimum biological requirements. Anything less than a complete food must have a descriptive label statement approved by the Scientific Council. The Council will lay down certain requirements, certain rules and regulations, if and when the proposals are approved by the NRA. Dr. Cowgill will draw up a set of principles of practical interpretation which, upon approval by the Council, will then be published by the Code Authority. Canned dog food manufacturers will then know exactly, on the basis of that statement of principles of interpretation, whether or not their products comply with these broad rules." An example of how all this would apply to chemical analysis of dog foods was cited.

But Mr. Haddock and his co-workers on the Consumers' Advisory Board think in terms of biological values. He read from a letter Mr. Dunn had written Mr. Chappel, referring to the minimum standard: A food "which has the value necessary to sustain the life of a dog and to keep it adequately nourished and in good health and condition, and permit it to reproduce and nourish puppies." Would there be, Mr. Haddock asked, any objection to putting that right into the plan?

Mr. Dunn: "None whatever, only I would prefer to have it drawn in the broader form."

Asked if the principle of reproduction would cover three or more generations of standard laboratory animals, as a test of nutritional values would be included in the biological value section defining the requirements of a complete dog food. The answer was "yes and no." An affirmative answer was vital. Well-known students of nutrition —Cannon, Dawley, Darling, Hart, McCollum, Mitchell, Oser, Patton and others—had agreed as to the soundness of the three-generation test. Quotations, letters or wires from all these experts had been filed with the NRA by the Breeders' and Veterinarians' League. Haddock knew it. He insisted upon getting it—and did get it.

Doctor Cowgill made the following statement: *"A canned dog food that will successfully pass a three-generation test, with standardized test animals of known nutritional history, might be adequately called a complete dog food for practical purposes,"* and added that he did not think any student of nutrition in this country would seriously argue that point.

If and when this principle is put into effect and dog foods are required to meet it, or be labeled otherwise, many practical questions on adequacy and comparative biological values constantly confronting both dog owners and canine practitioners will be answered officially. If Doctor Cowgill and Mr. Dunn can and will bring this about, honest dog food manufacturers, the veterinary pro-

fession and all dogdom will standard everlastingly indebted to them.

The standards and plan for enforcement proposed by the Code Authority will be rewritten, incorporating numerous amendments proposed and agreed to at the hearing. In the meantime, months will probably have elapsed and "racketeering" will have continued just that much longer. The revised plan will ultimately be resubmitted to the NRA for approval unless in the interim the NIRA has lapsed through the failure of the Congress to extend it beyond its present expiration date in June.

Small-Animal Practice Antedates Dairy Practice

During the 1834 session of the veterinary school at Alfort, France, 570 animals were admitted to the infirmary—382 horses, 5 asses, 1 goat and 182 dogs. In the same year, 950 animals were admitted to the infirmary of the veterinary school at Lyon, France—430 horses, 36 asses and mules, 1 cow, 5 goats, and 464 dogs and cats. The remainder comprised an ape, a coot, a wolf, a squirrel and other animals less common.

International Veterinary Congress Expert

When in August 1929, the Organizing Committee for the Eleventh International Veterinary Congress was maturing its plans for that meeting, which was to convene in London the following summer, Dr. Fred Bullock, General Secretary of the Congress, engaged the services of E. Haux as linguist for the committee, with whom he remained until the report of the Congress was prepared for publication. Following the completion of his work in London, Mr. Haux went to Buenos Aires where he remained two years, and until he came to the United States.

Mr. Ernst Haux

On the recommendation of Doctor Bullock, Mr. Haux was engaged in November 1933 by the Organizing Committee for the New York Congress, to assist Doctor Hoskins, General Secretary for the Twelfth International Veterinary Congress. His familiarity with the work, owing to his experience with the London Congress, contributed much to the success of the undertaking. He had charge of all German, Spanish and French correspondence in connection with the Congress and assisted further because of his familiarity with Congress procedure and his extended international acquaintance among veterinarians. Because of his ability to speak all official languages of the Congress and other languages also, he was of great assistance to foreign delegates to the recent New York Congress.

He remained with the American Organizing Committee, at the office of the A. V. M. A., till February 1935, assisting in the preparation of the report of the Twelfth International Veterinary Congress, which will be printed in four languages.

When his work on the report was completed, Mr. Haux returned to Germany—his native country, from which he had been absent about six years. Before the Swiss delegates to the Congress left New York, they discussed with him the matter of engaging him for the work of preparing for the next Congress, which is to convene in Switzerland in 1938.

Nutrition, Vitamins and Resistance to Distemper

By W. O. FROHRING,
Cleveland, Ohio

WITH the development of the science of bacteriology, the trend of thought in explaining pathological conditions was to seek its cause by the *presence* of some factor such as pathogenic bacteria, viruses, etc.

In recent years, however, with the increasing knowledge of the rôle played by accessory food factors, such as the vitamins, more and more attention has been focused on the pathological conditions produced by the *absence* of a factor.

That a normal state of nutrition confers resistance to infection is an idea that has long been held. Ever since the discovery of the accessory food factors, an impressive amount of time and energy has been devoted to defining the different nutritional deficiencies and also to a search for those food factors which might promote resistance to infection.

The first indication of the necessity of an accessory food factor which was necessary to insure normal health and growth was the work of Stepp.[1, 2, 3]

Results pointing to a more clear conception of this were obtained by the work of McCollum and Davis[4] who discovered the "fat soluble A" vitamin. They showed that rats failed to grow on artificial rations in which lard or olive oil was the only source of fat, whereas good growth was obtained by the addition of an ether extract of egg yolk or of butter to the diet.

In 1921 Steenbock, Nelson and Hart[5] reported the incidence of an ophthalmic reaction in dogs fed a fat soluble vitamin deficient diet. Within a period of 94 days, three out of five dogs on this diet came down with an ophthalmia such as had been observed by others in experiments with rats, mice, rabbits, chickens and also clinically in man.

Ralli, Pariente, Flaum and Waterhouse[8] made a study of vitamin A deficiency in both normal and depancreatized dogs.

The necessity of vitamin A in the nutrition and health of the dog was further confirmed by Mellanby[6] who, working with dogs, reported on the relation of diet to susceptibility to infection of the respiratory tract. In a special report[7] he commented on the "readiness with which dogs succumb to distemper and the great intensity of mange when these diseases appear in animals whose diets are deficient in vitamin A."

In the special report, Mellanby's summary was as follows:

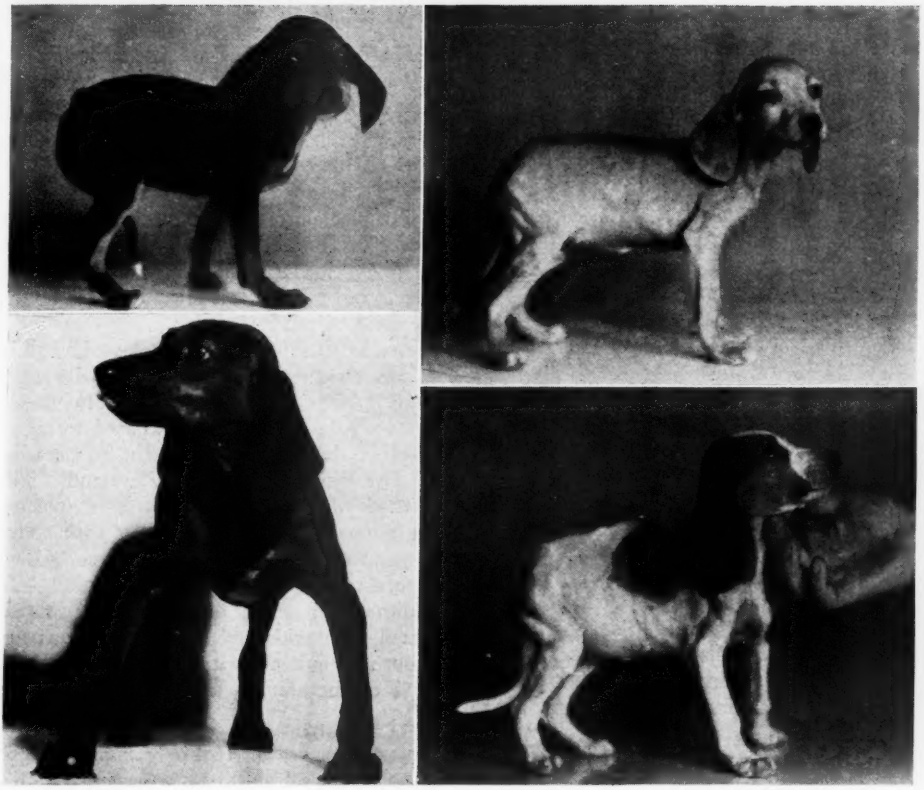
"Diets defective in quality but abundant in quantity may be responsible for the following conditions arising in animals.

1. Heart failure during anesthesia and difficulty in recovery so that after anesthesia they refuse food and lose weight.
2. Several types of nervous defects including incoordinated movements, paralysis, convulsions and tetany.
3. Keratomalacia.
4. Increased susceptibility and lowered resistance to distemper and other catarrhal conditions, broncho-pneumonia, and skin infections like mange."

It should be noted that at the time this report was made the various vitamin deficiencies were not as clearly defined as at the present time, and he is describing the results of several vitamin deficiencies.

More recently Olcott[10] and Stimson and Hedley[9] confirmed the necessity of vitamin A in the diet of dogs and on a vitamin A free diet, produced xerophthalmia.

Early in the work[11, 12] on vitamin A, it was observed that in vitamin A depleted rats there was an increased susceptibility to respiratory infections. That under similar dietetic conditions puppies also often develop broncho-pneumonia, has been shown by Mellanby. The reaction of the diet to infection later attracted more interest and was later followed up in relation to the intestine by Cramer.[13] This followed the work of S. Mori[14] and his observations on the



VITAMIN A DEFICIENCY

Upper left: Vitamin A deficiency, declining weight. The skin lesions about the eye are commonly associated with vitamin A deficiency. The muscle weakness also is characteristic.
Upper right: Early stage of vitamin A deficiency.
Lower left: Vitamin A depletion; not extreme. The straddling is due to adductor muscle degeneration. It is often seen in the hind legs also. This condition is largely permanent, i. e., it is not remedied by curative treatment. The same thing may be noted in the divergent strabismus in the figure above.
Lower right: Advanced vitamin A deficiency, emaciation, growth stopped, weight declining, muscle degeneration.

hyperplasia of epithelium produced by fat soluble vitamin A deficiency. Wolbach and Howe[15], while primarily concerned with the epithelial changes, also noted that the local infective conditions were often found at the seats of epithelial change.

A consideration of the general acceptance of the fact that animals depleted of vitamin A or carotene show an increased susceptibility to infections, led us to a study of the possible rôle played by the vitamin A intake of dogs in relation to their resistance to distemper.

Through the cooperation of some of the members of the Cuyahoga County Veterinary Association this was approached first by a study of the vitamin A reserves in the livers of dogs of known age and clinical history. The livers were assayed for their vitamin A content by means of the antimony trichloride test and expressed in blue units as indicated on the Lovibond tintometer.

This preliminary study showed some interesting results and brought out the fact that one might reasonably expect older dogs to have the highest reserve of vitamin A. Two typical examples of dogs that had died of accidental causes and that showed a high reserve, were first, a Pekingese female, five years old, that died after a caesarian operation. The liver of this small dog showed 348,000 blue units. A three-year-old Boston female that died of internal hemorrhage following an operation, showed 965,000 blue units.

An interesting case was that of a puppy reported by the owner as not feeling well for two weeks, which was brought into the hospital and given serum on the third and fourth days, and died on the fifth. The liver in this case showed absolutely no color with antimony trichloride, indicating an absence of vitamin A storage. In this case, serum therapy was used where vitamin A therapy was indicated. A young puppy one week old still getting the bitch's milk, showed only 345 blue units in the liver. The bitch was liberally supplied with vitamin A, but, as has been demonstrated in other animals, this is not a satisfactory way of building up the reserve of puppies.

Busson and Simonnet[16] showed that the liver of a newly born pup was deficient in vitamin A, although the maternal liver contained it in a large amount. After three months' satisfactory breast feeding, the liver of the pup has become a fairly potent source of this factor. If, however, the mother's milk supply was inadequate, the vitamin A content of the liver of the young remained as low as it had been at birth.

These same authors, in reporting on the distribution of vitamin A in the normal animal organisms, found that a dog that was given a liberal dose of carotene in oil for a month and then killed, and the lungs, liver, kidneys, brain and part of the body fat were tested on rats for vitamin A, only the liver and kidneys contained vitamin A. In other experiments, a little vitamin activity was found in the lungs. The writers conclude that the variation in the vitamin A content of the liver may be taken as indicative of the variations in the amount of vitamin A in the whole animal.

The fact that young animals such as puppies have low reserves of vitamin A at the time of weaning, and of the relationship of vitamin A deficiency to increased susceptibility to upper respiratory infections in other animals, led to this study.

Carotene (pro-vitamin A) was used as a source of vitamin A activity because it may be given in large amounts without toxic effects and because it is uncomplicated by the presence of other vitamins. The diets were controlled insofar as the intake of vitamin A was concerned and were otherwise complete. After this preliminary treatment for 30 to 60 days, they were exposed to active cases of distemper through the cooperation of Dr. Royce Powell of Cleveland. The method of exposure consisted of placing the puppy in the cage of a dog with active distemper for at least two days, simulating natural exposure as closely as possible. In addition, commercial distemper virus was injected both with and without previous exposure to animals with distemper in about 25% of the animals used.

These studies have been in progress for almost three years. Not only have the nutritional factors been given consideration, but also the so-called "secondary invaders" involved have been studied in many cases of spontaneous as well as experimentally produced cases of distemper. A complete report of these studies is not justified at this time in spite of the fairly large number of animals used (192). With the experience gained in the results obtained so far, we hope to continue these studies with a much larger number of animals.

The following tentative conclusions, however, seem justified from the results obtained so far:

1. The rôle of vitamin A in distemper seems to conform to the widely-held conception of the relationship of vitamin A to upper respiratory infections, that vitamin A, by promoting healthy epithelial tissue, particularly of the upper respiratory tract, tends to close this portal of entry to infections.

2. The term "distemper" is being used so broadly in relation to sick dogs.

3. Present methods of immunization are not a complete answer to this problem.

4. Various vitamin deficiency symptoms often complicate the clinical picture.

5. The relation of the vitamin B complex to distemper is deserving of further study, especially in relation to the form of distemper which seems to have its origin in the intestinal tract beginning with a diarrhea with bloody mucous in the feces.

6. From the evidence obtained in these studies, the rôle of nutrition, especially the accessory food factors, in reducing the incidence of infectious diseases of dogs commonly referred to as distemper, deserves further study.

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Hogs were reduced by 20 million last year, which is called "the most striking annual change ever shown in this country's livestock inventory."—*S. N. L.*, 24:730.

Veterinary Nursing

In caring for sick animals, there are certain factors that are often more important than therapeutics or surgery. I refer to sustaining the patient by measures that minister to the comfort, contentment, strength and well-being—by hygienic care and thoughtfulness, and by proper nutrition. In a word, by good nursing.

For growth and repair of tissue, we must depend mainly upon proteins and they must be suited to the animal—animal proteins for the carnivora, vegetable proteins for herbivora. For dogs, suitable proteins may be found in eggs, milk, meats and milk products; for horses and cattle, in cereal concentrates or bright legume hay.

For energy and to supply heat, we require carbohydrates and fats for all animals. Carbohydrates are available in cereals and sugar; the fats are available in milk, cream and various oils, including those in meat and certain cereals.

Water, except where specifically contraindicated, as in gastro-enteritis, should be constantly accessible to the patient. It should be pure and in a clean container and of a temperature pleasing to the animal—cool for the dog, tepid for cattle, etc.

Minerals and vitamins should be supplied in the diet. These may be given through the addition of milk, vegetables, alfalfa and fruits, or in more concentrated feed supplements.

A second major consideration is the sanitation of the quarters and surroundings of patients. In a hospital for large or small animals, there should be separate wards for contagious diseases or other ailments. Quarters should be cleaned daily or oftener, and the collected *debris* removed. Where practicable, the quarters should be scrubbed daily with soap and water, and then rinsed. Clean pads, blankets or other types of bedding should be provided when needed and the water kept in containers that will not turn

over easily. Uneaten feed should be removed shortly after the animal quits eating.

In nursing the patient, there are two main channels of elimination, intestinal and urinary, that should be kept active to rid the system of harmful products of metabolism and injurious substances formed as a result of the reaction of the body against the disease. In any disease, if the kidneys are working and the intestines function actively, so that waste and toxins are eliminated as fast as formed, the cells can put up an improved reaction and the patient has a far better chance of recovery. When caring for an animal, one should note the number, if possible, quantity and character of the eliminations from the intestine and kidneys. Attention should be paid to the feces as to color, the presence of unusual matter such as blood, pus, worms, mucus, the amount of undigested material, etc. In watching urination, one will be able to tell whether the animal has many and difficult micturations, and whether the specific gravity is changed. Urine analysis is often beneficial. Careful observation of the patient gives important clues as to the animal's progress during the disease and many times serves to correct a faulty diagnosis.

Wherever indicated, as to prevent atrophy from disuse, etc., the patient should be given exercise. This should, however, be restricted according to the condition of the patient. About every organ of the body is affected by the activity or non-activity of the skeletal muscles. When the patient is not able to take active exercise, passive exercise, in the form of massage or manipulation may be given. This supplies some of the benefits of exercise, at the same time adds interest in life and gets the animal's mind off its ailment, and conserves its energy.

Understanding the patient is very important, but is many times neglected. Some psychologists claim that animals cannot reason. This view finds little support among veterinarians. If kindness, sympathy and coaxing is employed, instead of pushing, shoving and harsh words, the animal may get the idea that it is really in the hands of a friend and will respond to its own benefit, and the convenience of the doctor, perhaps taking nourishment with a little coaxing just to please him. Then too, the owner may wonder, and rightly too, about the care and treatment the animal has received in the hospital, if he cowers or is afraid after being there for some time. The old saying, "A little kindness pays big dividends," holds true in veterinary practice as elsewhere—and it pleases clients. In fact, that is one of the ways in which it pays.

This branch of veterinary practice—nursing—is often neglected by the average veterinarian, to his cost. It may be made one of his best assets.

Fred Fischer,
Manhattan, Kans. K. S. C. '35.

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Book Review

Black's Veterinary Dictionary, edited by William C. Miller, M.R.C.V.S., F.R.S.E., Courtauld Professor of Animal Husbandry, Royal Veterinary College, London. Second edition, cloth bound. 1150 pages, 8 plates and 327 figures in the text. MacMillan Company, New York, N. Y., $8.00.

This work, according to its author, is "modeled upon the plan and general design of Black's Medical Dictionary." It is comprehensive in its coverage of the chief contagious and specific diseases of livestock; an admirable example of simple and non-technical presentation of rational therapy for the stock breeder in emergencies.

It likewise contains fundamentals lacking in more advanced textbooks and reference works. If the veterinary student will assimilate a reasonable proportion of it he will obtain a ground upon which to build clinical knowledge later. Miller offers a simple and nourishing diet for the student's mental digestion.

There are too few references to small animal treatment, nevertheless the small

animal practitioner can well afford to be acquainted with the general subject matter. Even in this day of specialization in veterinary practice, the owner of any animal expects capable assistance when he calls for the services of a veterinarian.

The author has brought this veterinary contribution up-to-date, to include the more recent knowledge and research. The work is alphabetically indexed, and information sought may be found instantly. The nomenclature employed, likewise, assists the user of the work for reference, since the text is not encumbered with scientific names which are synonymous, yet localized in their use. —H. J. M.

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Horse Racing in America

Very striking and amusing scenes may be witnessed upon a Charleston race-course. I remember being present at the running of a famous match between a Virginian and South Carolina horse. The two first heats were won by the Virginian, and the two last by the favorite of South Carolina, whose name, I recollect, was Bertram. The interest always attendant upon a good horse-race was increased to intensity by the feeling of state rivalry prevalent all over the union, and which is called forth in its full strength on such occasion. Many a dirk was grasped and fierce threat uttered. At last the South Carolina horse came up victorious, and the scene which followed recalled to my mind Gibbon's account of the Blue and Green factions of Constantinople, when the triumph of a political party depended upon the speed of a horse. Ever since, the horse-races in England have appeared to me to be very tame affairs indeed. I was in New York at the time of the match between Henry and Eclipse, between the north and south, which is well remembered by many as evidencing the existence of a spirit of rivalry by no means favorable to the future permanence of the federal union.—Whittaker's Monthly Magazine. (*The Veterinarian*, Vol. VIII, No. 95, November, 1835, page 660).

Progress in Farm Technology Brings Disaster

In 1900 there were 20 million horses employed and in 1921, 21 million, but in 1931 there were only 13 million or a loss of 8 million horses in eleven years due to the change from horse power to gasoline. This elimination of the horse reduced the consumption of food farm products equivalent to the food consumption of 40,000,000 people. An apparent *advance* in the technology of farming caused, as an immediate direct result, the greatest disaster that could have happened to the farm.

Then, too, by using 27,000,000 automobiles, the American people, instead of walking and using their own energy, consumed 15 per cent less meat per capita in the same period, with the result that the number of cattle decreased in the United States from 40 million head in 1920 to 30 million in 1931. These 10 million [beef] cattle, which have been lost, annually would consume as much food as 50 million people. There was during this period a loss of about 17 per cent in the demand for farm products. The present use of automotive power means that approximately 20 per cent of all farms in America are no longer needed, and if no control is applied the next most probable state of the American farmer will be even worse. The value of the American farm has, according to the United States Department of Agriculture, gradually decreased according to the index number of 156 in 1921 to 116 in 1929 to probably as low as 70 in 1932.

By individual technology the farmer has not strengthened his position financially, since between 1910 and 1931 he purchased seven billion dollars worth of automobiles, trucks and tractors. These were *not* bought from his income, for farm mortgages increased during that same period eight billion dollars. The outstanding debt against their equipment [automobiles, tractors and tractor-drawn implements] remains, but about 90 per cent of the equipment itself has reverted to rust and decay.

Stated in another way: Only 200 mil-

lion acres, instead of the 350 million acres now under crop cultivation in the United States, are necessary to furnish all the food and raiment that all living things in this country require. This excess acreage is largely inclusive of what is termed submarginal lands or land incapable of yielding an average crop without entailing a large expense.—*The Chemical Foundation.*

* * * *

Stringhalt

Stringhalt is a symptom of a condition, the cause of which is unknown. Many theories have been advanced as to its cause, by both American and European veterinarians, but all lack conclusive proof. Three hundred years ago Markham wrote of it: "This is an unnatural binding of the sinews, which imperfection a horse bringeth into the world with him, and therefore it is certain it is incurable, and not painful but only an eye-sore."

The word stringhalt is meaningless. It probably originated from "springhalt," which is descriptive of the condition, since when an affected horse lifts the leg from the ground it bounds upward, halts momentarily, is carried forward and then returned to the ground forcefully. Many early writers used the term springhalt, but at present stringhalt seems to be the popular term.

Fritzherb[1] stated: "The stryng-halte is an yl disease, and maketh him to twyche up his legge sodeynly." That was four hundred years ago and today stringhalt is the same ill disease and makes him to twitch up his leg suddenly.

"This is an affliction of the hind extremities which is frequent in horses and observed also in mules (Bassi), donkeys and cattle (Booth Furlanetto); an analogous anomaly has been observed in the fore legs (Rigot, Delabice, Blaine, Goubaux, Hering, Siedamgrotzky, Moller, Jacoulet and Barrier). In some cases, the trouble is hardly noticeable. In others it is so marked that the foot strikes forward against the abdominal wall. Although ordinarily it develops slowly, accentuating by degrees, there are cases where it appears suddenly without any appreciable cause."[2]

"The term 'stringhalt' signifies a peculiar derangement in the movements (ataxia) of the horse which is characterized by a sudden jerking, involuntary, excessive flexion of all the joints of the hind limb."[3] In standing posture, nothing abnormal is observed; but when walking, the leg, at the beginning of the forward stride, is raised with a jerk abnormally high and quickly brought to the ground, which it strikes rather hard. In rare instances it disappears with work to return when resting. Some animals show the jerky action only when turned in a narrow circle or forced to step over from one side to the other.

"In stringhalt the animal seldom walks upon the toe as it usually does in spavin. In spavin, when turning or stepping from one side to the other the animal usually steps lightly upon the toe, and for about one third of the stride, the toe is almost dragged over the ground; whereas in stringhalt, the leg is jerked up and the foot is put down firmly. In spavin, the leg is usually dragged when first starting, while in stringhalt, the action is spasmodic from the very beginning."[4]

Some authors state that this condition is more easily observed when the horse is walking. Others say it is more easily observed when the horse is at a trot, while still others state that it is more easily detected when the horse is backed from his stall after having been at rest. Perhaps the latter is true in the majority of cases.

In view of the fact that the cause is not known, all treatment must be empirical; yet the results in many cases are gratifying. Boccar, as early as 1845, recommended that the tendon of the lateral digital extensor be sectioned near its junction with the long digital extensor. Bemis[5] said that in his experience this operation is 50 per cent successful. Ellis[6] describes an operation used by R. P. Marstellar in which a section of the lateral digital extensor is removed. In his experience (25 cases), the operation was 100 per cent successful. Results such as this are most gratifying, yet upon so few re-

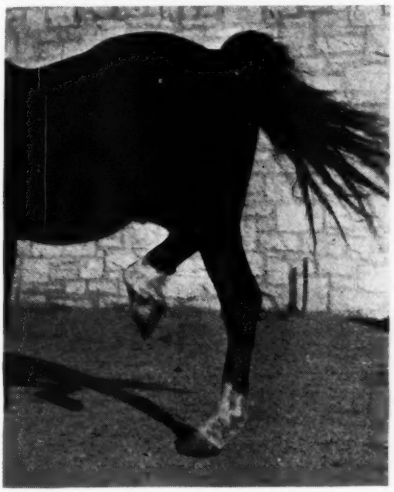
corded cases, definite conclusions should not be drawn. Marstellar,[7] in commenting upon this operation states: "We saw the late J. H. Blattenberg operate, using what is sometimes called the 'high' operation, at the meeting of the American Veterinary Medical Association, Montreal, Canada. He stated that the operation had relieved cases more promptly and in higher percentage than the other operation. We have been using this method and it has occurred to us that our results were more satisfactory. We do not recall a single case that has not improved; many of them recovered. Major Ewing, V. C., U. S. A., operated on a number of cases at Fort Sam Houston during the past two years. At the Veterinary Congress in New York last summer he stated that the results were highly satisfactory."

The "high" operation for the relief of stringhalt is as follows:

Instruments.—The selection of the usual scalpel for skin incision, hemostats, curved scissors, blunt-pointed curved bistoury, razor, needles, suture material, cotton, gauze, hypodermic syringe, etc., will vary according to the preference of the operator.

Preparation.—Confine the animal on an operating table with the affected leg uppermost; shave two areas over the tendon of the lateral digital extensor; one at its junction with the long digital extensor, and the other beginning an inch below the level of the lateral malleolus of the tibia and extending several inches upward. Thoroughly clean the areas, dry and paint with tincture of iodine. Infiltrate the skin and around the tendon with a two per cent sterile procaine hydrochloride solution using about 10cc in the lower area and 25cc in the upper area.

Technique.—Make an incision one-fourth inch long over the tendon of the lateral digital extensor near where it joins the long digital extensor. Dissect the connective tissue away from the tendon and insert a blunt-pointed curved bistoury, from before backward, under the tendon and sever it. Make a second incision beginning at the level of the lateral malleolus of the tibia and extending upward for one and one-half inches. Bluntly dissect around the tendon until it is possible to insert, beneath it, a pair of curved scissors. With one hand on each end of the closed scissors exert steady traction until the tendon slips from its sheath. It may be necessary to dissect out the tendon. Many times it is so firmly adherent to its sheath that it cannot be pulled out without dissection. When the tendon has been



pulled from its sheath, cut it off at the upper end of the incision. The skin incisions are then closed with braided silk, using either interrupted or continuous sutures. A flexible collodian bandage is applied to complete the operation.

After care.—The after care is simple. The horse is kept at rest for four to six weeks, the sutures being removed on the fifth day after the operation. Should the operative areas become infected, treat as open wounds.

Precaution.—When inserting the bistoury to sever the lower end of the tendon, it is needful to insert it from before backward. In this way if the animal flinches, there is no danger of severing the tendon of the long digital extensor; a grave accident.

If an operating table is not available, the horse may be cast, the affected leg bound to a long pole and held by an attendant. If the horse is of a quiet disposition, he may be crowded over in a stall and a body rope

fastened snugly around him, then with a side line the sound leg may be lifted and the operation performed with the animal in the standing position.

Until more is known of the etiology of stringhalt perhaps this operation is the best treatment. The present tendency is to classify it as a disease of the central nervous system, allied to weaving, shivering, jinxed back and similar little-understood conditions. Others regard it as a symptom of a general skeletal disease of which navicular disease, ringbone, sidebone, spavin, shifting lameness, and arthritis are symptoms and regard all these conditions as being of nutritional origin. Some still adhere to Markham's theory that stringhalt is inherited, or that a tendency to it is heritable.

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Manhattan, Kans. K.S.C., '35.

Colic from Obstruction of Ileocecal Orifice

A mare, nine-years-old, weighing about 1350 pounds, well fed on coarse prairie hay and oats, showed slight colicy symptoms. She was given one-half grain of arecoline and one grain of lobeline.

The next morning, she was much worse. Temperature of 102°F., and a pulse of 100. I suspected enteritis and gave her eight ounces of sodium hyposulphite. In four hours, noting no change, I gave her another dose of six ounces, followed by seven minums of fluid extract of aconite and 15 minums of fluid extract of belladonna every hour for eight hours.

The next day there was no improvement; temperature 102.5°F., pulse 100 and very irregular. I gave her three 10-ounce doses of mineral oil at five-hour intervals and continued the aconite and belladonna. She did not lie down the last day until just before she died that night.

She never at any time had general cold sweats, or cold ears, as usually seen in enteritis; but there were patches of sweat on the neck and sides. There was no peristalsis at any time and the abdomen was rather contracted. Feces was passed only twice during the sickness. At times she would drink a half pailful of warmed water.

Except for the first night, it was not a violent case of colic, but the pulse from the first, indicated to me a fatal outcome. Its intermittent character and weakness was indicative of shock. During the last day, respiration became rapid. I suspected the attendant may have poured mineral oil down her trachea, but could not determine on ausculation evidence of my suspicion. Urine, sometimes very scanty, was passed daily.

On autopsy the entire intestinal tract was examined carefully. The ileocecal orifice was packed with dry fodder. Looking at it from the opened cecum, the orifice was open about one and one-half inches in diameter and plugged hard within the ileum with wheat straw chaff and hay. I would say two quarts of the semi-dry ingesta lodged there. Anterior to that, the entire small intestinal tract was gorged with liquid contents. Posterior to the ileocecal orifice, the cecum and the large colon contained only a small quantity of semi-dry fodder; no gas, in fact, the large intestine was collapsed to less than one-quarter of its normal size when filled with soft ingesta. The contents of the large intestine was scanty, dry and hard.

Gas distension was confined solely to the small intestine; the line of demarcation being at the obstructed ileocecal orifice.

I may add that a general inflammatory condition was presented throughout both peritoneal and pleural regions, with hemorrhage in the mesentery supporting the ileum, also well marked pulmonary inflammation, possibly the result of absorbed toxins.

T. V. Simpson,
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Disease Census for the Veterinarian

The veterinary profession has endeavored to keep abreast with the medical profession in most of its activities. It has done well in most fields and even excelled the medical profession on a few occasions. The one field in which the veterinary profession has come near failing is that of disease census.

The medical profession has long kept vital statistics. These have dealt chiefly with the following: Mortality, prevalence of male births over females, comparative mortality of males and females, of rural and urban populations and of the different age groups. Probably the first such census was taken in 1532 when Creighton gave a report of deaths caused by plague and deaths caused otherwise. Others who have contributed to such census through the years, are Captain John Grunt (1620-74), Sussmilch (1707-67), Quetelet (1796-1874), William Farr (1807-83), Sir Francis Galton (1822-1907). These are the men who have developed our present day biostatistics in human medicine.

Statistics of human biology have been brought about by: (1) census method in which births are added and deaths are subtracted; (2) the registration method in which life is recorded when it began, any obstacles, such as disease, enumerated and death with its cause; and (3) the case record method of recording, in which temperature, duration, symptoms and other data are recorded.

The veterinary profession is greatly in need of a more extensive disease census. It would be extremely useful to know the number of deaths, and percentage of deaths, in each disease. To attempt control of epizootics without knowing whence or why they come, what they do or where they go, is to work largely in the dark. Some diseases thought to be of great significance, might warrant only small attention, and diseases which have been thought unimportant, might be found to be highly fatal. Diseases, comparatively simple ordinarily, on some occasions become extremely important. A good example is sarcoptic mange of horses. Generally it is given little consideration, but it became the most important disease of American animals in France during the World War. The resultant losses were enormous. In some outfits, the incidence of mange reached 100 per cent, with a 10 per cent mortality.

Many diseases constantly change in virulence, examples being influenzal diseases and most infectious diarrheas. Some which were extremely virulent formerly seem less pathogenic now. Others, such as canine distemper, appear to be increasing in virulence. New diseases developing a significant mortality, are reported from time to time. In most instances, such diseases are not new, but have suddenly become more pathogenic. Occasionally, harmless organisms take on and retain highly pathogenic properties. The virus of hog cholera is probably one such organism that has become pathogenic within the history of veterinary medicine that animal disease statistics would help to answer.

The extent to which a disease is prevalent in a community, the complications with other diseases and the significance of periodicity are fast becoming recognized as important factors.

Cyclic disease occurrence is probably best seen in wild animals, which seem to multiply and thrive for a period and then practically disappear, to reappear in great numbers after a period of years. Another factor is faulty diagnosis which would be discovered and lessened by disease statistics. A veterinarian would be able to observe that some of the diseases which he believes he satisfactorily controlled, are of little importance anyhow. Rabies is on the increase in the United States, yet we have the means for satisfactorily controlling it. Dependable statistics might convince the public control measures should be employed.

It will be difficult for veterinarians to develop comprehensive disease statistics in the absence of official measures. Statistics will be very incomplete at first, but something may be done by veterinary associations, once their importance is realized. The Eastern Iowa Veterinary Association has shown the possibilities of such work in a limited area. At present, the Veterinary Corps of the United States Army keeps records of disease among army animals, which are very satisfactory and very useful. The federal Bureau of Animal Industry has kept accurate records of foot-and-mouth disease outbreaks and accumulated a large mass of data concerning tuberculosis in the United States. The Bureau's record of diseases found in animals slaughtered under federal inspection, is highly interesting and potentially valuable, but little, or no use is made of it.

The livestock owners who administer treatment to the animals themselves, or acquire services from some local handyman, the loss of animals from no apparent ailment and which are not reported, or animals that die of diseases which are not diagnosed and mistaken diagnoses, are limiting factors to the value of an animal disease census, but are no excuse for not having one.

An animal disease census is feasible and would prove one of the most enlightening and satisfactory advances the veterinary profession could make at the present time, in decreasing mortality of animals. National, state and local veterinary associations should make it a major issue at all their meetings. The veterinary journals should encourage the program and publish developments from time to time. Veterinarians, as individuals, should cooperate to the fullest extent by supplying material, at regular intervals, for the disease census. With this plan consistently followed, a veterinary disease census would become a reality.

Johnson Hook,
Manhattan, Kans. K. S. C. '35.

Prussic Acid Poisoning in Cattle

The evening of August 7, 1934, we received a call to a farm four miles distant to treat cattle said to have been poisoned. There were 18 cows affected, 10 were down, lying on their sterna, breathing rapidly, head and neck extended, nostrils dilated and eyes protruding. The remaining eight were unsteady on their feet, respirations increased and several were bloated.

Each cow was given 30cc of a 10 per cent solution of sodium nitrite intravenously. A stomach tube was passed on the bloated animals to allow gas to escape.

Two of the cows died immediately after our arrival. The remaining 16 made uneventful recoveries.

These animals had broken out of their pasture into a field of sargo—one of the sorghums. The sargo plants were about 18 inches high.

On post-mortem examination of the two dead animals, it was noted that one had a very small amount of sargo in the rumen, while the other one had a much larger amount. The one having the lesser amount died first. Both animals were well along in pregnancy. This, with similar observations on post-mortem examinations of victims of cyanogen poisoning, I think, demonstrates the fact that animals vary greatly in their tolerance of prussic acid.

In treating cyanogen poisoning, two points should be borne in mind:

1. Be ready to go on these calls when they are received. Lose no time.

2. Always have a fresh solution of the sodium nitrite solution ready for intravenous injection. This can be accomplished by having the sodium nitrite crystals already measured out in a sterile bottle, then all that has to be done is to add distilled water and you have a fresh solution.

S. F. Zickefoose,
Manhattan, Kans. K. S. C., '35.

Empyema of the Frontal Sinus of the Ox

J. L. CAVANAUGH,
Kansas State College, '35
Manhattan, Kansas

FEBRUARY 13, a three-year-old, milking shorthorn cow was presented for treatment at the veterinary clinic of Kansas State College. The following history was given:

The cow had been dehorned, by the use of a saw, about a year previously. A few weeks after dehorning she was noticed to stand with her head pressed against some object, and to go into convulsions. Following this pus was discharged from the right horn base, which had not completely healed. After a time the cow returned to normal. In a few months the same condition again developed. The milk flow decreased sharply during the attacks.

The case was diagnosed as empyema of the frontal sinus, and an operation decided upon. The cow was placed on the operating table, on her left side. An area about two inches square, and one-and-one-half inches above the right eye, on the lateral edge of the frontal bone, was shaved and disinfected with tincture of iodine. The area was anesthetized by infiltration with a one per cent solution of procaine. A circular piece of skin and fascia one-half inch in diameter was removed. A trephine opening of the same diameter was made into the frontal sinus and drainage thus established.

The sinus was filled with pus. A gauze seton was put through the horn core and out of the trephine opening. The sinus was flushed daily with a two per cent solution of potassium permanganate. The seton was removed on the second day and a gauze plug impregnated with Iodex ointment was inserted in the trephine opening. The horn core was left open. The cow is making a nice recovery at the present time.

The frontal sinus of the ox is different from that of the horse. It corresponds to the anterior surface of the cranium, and also extends into the horns, when the latter are present. The anterior limit of the sinus corresponds to an imaginary line drawn through the middle of the orbits. Medially, it is separated from the sinus of the opposite side by a complete bony septum. Posteriorly the sinus extends about one inch behind the poll, and laterally to a point just anterior to the external ear. The sinus as a whole is divided by many incomplete bony septa, which make drainage very difficult. One of the compartments, the post orbital diverticulum, is nearly back of the orbital cavity. This is separated from the temporal fossa by only a thin plate of bone, so that if this breaks down, infection involves the region back of the eye.

Infection of the frontal sinus of the ox is commonly seen after dehorning operations, especially when this operation is performed in animals so mature that there is a continuation of the frontal sinus into the horn.

To obtain drainage from the frontal sinus, it is necessary to make openings outwardly so that the various compartments will readily discharge their contents. These openings should be made only where the frontal sinus has its deepest cavities. A plan generally accepted is to lay out an area in the shape of a wide branched horseshoe over the frontal bone. The upper branch would rest upon the median line in the region of the poll, the toe upon the lateral portion of the frontal region, and the other branch would lie on the median line in the region of a line drawn through the middle of the orbits. Any point covered by the shoe is a safe point for trephining the frontal sinus. Care must be taken to avoid the frontal vein which lies in the dish of the face

and enters the supra orbital foramen. It crosses the area of the shoe about one and one-half inches medial to the eye.

Over this imaginary horseshoe there are three preferred places to trephine. One is just below the poll and midway be-

tween median line and horn core. The second preferred place is just medial to the bony ridge which marks the lateral limit of the frontal sinus, or one to one-and-one-half inches back of the eye. This corresponds to the toe of the imaginary shoe. The third place of choice for a trephine opening is just posterior to a line drawn between the center of the orbits and about one-and-one-half inches from the median line. From this last opening, drainage may be made into the nasal cavity by passing a probe down and through the median line. If an abscess develops in the temporal fossa from a breaking down of the wall of the post orbital diverticulum, temporary relief can be obtained by making an incision at the most prominent part of the swelling.

By following the above outline for making trephine openings into the frontal sinuses good results are usually obtained.

References: Dollar's Veterinary Surgery, Sisson's Anatomy and Bemis' Veterinary Surgical Operations.

Do You Remember?

1. Question. Who is "the father of modern genetics?"

Answer. Because Gregor Mendel formulated enough principles from a chaotic and conflicting mass of results to establish genetics as a science, he is commonly known as the "father of modern genetics." He began his experiments while an abbot at Brno, Czechoslovakia, in 1857, in a monastery garden. The value of his works was not recognized until 1900, when three botanists—working independently—discovered and described them simultaneously.

2. Q. Why did Mendel succeed in placing genetics on a scientific basis after so many others had failed?

A. Mendel was endowed with a fine scientific mind which gave him the keenness in observation and clarity in reasoning necessary to carry on such investigations. He made a wise choice in selecting the common sweet-pea for his experiments, because it had many different characteristics, was naturally self-fertilized, was readily fertilized artificially and large numbers were easily cultivated. Then he observed various characteristics singly, made artificial hybridizations when necessary, kept accurate pedigrees of each plant, and made many statistical analyses of each plant and its offspring. Thereby, he was able to deduce laws from some of the hypotheses he formulated, rather than add more to the existing, confused theories.

3. Q. Of what importance has *Drosophila melanogaster* been to the study of genetics?

A. Much of the most valuable data in the science of genetics has been collected as the result of experiments on the little vinegar or fruit fly known as *Drosophila melanogaster*. It has been used to such a large extent because it produces a large number of offspring in a short time under laboratory conditions, has many varying characteristics, is easily crossed, and in many cases is readily

mutated; having only four pairs of chromosomes makes its study more simple than if it had a larger number.

4. Q. Define allelomorph; atavism; biometry; chromosome; dominance; gene; heterosis; independent assortment; linkage; meiosis; mutation; parthenogenesis; ploidy and segregation.

A. (1) An allelomorph is one of two or more contrasting characters; (2) atavism is the appearance of a character in an individual which was present in a distant ancestor, but not in a closer generation; (3) biometry is the statistical analysis of biological data; (4) a chromosome is an elongated body in the nucleus of a cell and carries its respective factors from one cell division to another; (5) dominance is the supercession of one character over its allelomorph; (6) a gene is a factor of a chromosome which determines one or more characters; (7) heterosis is the increased vigor or size resulting from crossing heterozygous (unlike) individuals; (8) independent assortment is the transmission of different factors to the offspring in groups; (9) meiosis is the halving of nuclear material in gamete formation; (10) a mutation is a sudden change in a characteristic which breeds true; (11) parthenogenesis is the production of offspring without fertilization by a male cell; (12) ploidy is a symmetrical change in the whole number of chromosomes in a cell; and (13) segregation is the separation and redistribution of factors in the offspring of hybrid individuals.

5. Q. What is the F_2 Generation?

A. The F_2 (second filial) generation is the offspring of the progeny of an individual; for instance, in relation to their grandparents, grandchildren are the F_2 generation.

6. Q. Differentiate between genotype and phenotype; fraternal and identical twins; and qualitative and quantitative traits.

A. (1) Genotype is the factorial makeup of the reproductive cells, and determines the appearance of the progeny; phenotype is the factorial makeup of the body or somatic cells, and determines the appearance of the individuals. (2) Fraternal twins are those resulting from the fertilization of separate ova, and may not resemble each other to any marked degree; identical twins are those resulting from the fertilization of a single ovum and are similar in all respects. (3) Qualitative traits are those characteristics which cannot be measured exactly, as color or mental ability; quantitative traits are those characteristics which can be measured exactly, as height and size.

7. Q. Are there albinos in dogs?

A. So far as known, no albino dogs have ever been reported. If they exist they are undoubtedly very rare.

8. Q. How long would it take to eliminate inherited deafness from a kennel of dogs, by not using any deaf dogs as breeders?

A. If all the dogs that could hear were used as breeders, deafness would never be eliminated. Although some of the dogs were normal, they would carry the factor for deafness which they would transmit to at least half of their offspring, even though they were mated with other normal dogs. These carrier dogs can usually be detected by a single mating with a deaf dog. Many similar conditions can easily be eliminated in the same manner.

Wesley O. Keefer,
Columbus, Ohio.

* * * *

For a thousand years pandemics of influenza have swept around the world at intervals of, roughly, 30 years. The victims number into the millions. The 1918-19 scourge killed more people than were killed in the World War. We may be reasonably sure that within the next 10 to 15 years, we will be visited with another pandemic of influenza and for the first time in all history, the prospect contains elements of encouragement owing to the research of Laidlaw and Dunkin on distemper in the dog.—D. J. Davis, Univ. of Ill. Col. of Med.

Emergency Cattle Feeding in Drought Areas

By E. S. WISEMAN,
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PERHAPS one of the most vital questions that have confronted the average practitioner in years is the emergency feeding of cattle in drought areas where it has been necessary to resort to feeds of inferior quality after the failure of the usual crops.

The average practitioner has a fair knowledge of feeds and feeding more or less adapted to his own locality, but when these resources fail he is confronted with many embarrassing and unpleasant moments when asked for advice as to emergency feeds with which he may be entirely unfamiliar.

Considerable work has been done to develop information concerning emergency feeds and their preparation. Veterinarians should be able to pass this information on to the feeder who desires maximum feeding qualities from such feeds as he may possess or be able to get. There is such a wide variety of feeds that may be used, that it is impossible to discuss them all here, but the principal ones may be mentioned.

The roughage or forage feeds are perhaps the more important to consider as they are in greatest demand in areas of drought. They are important to every feeder who relies upon them to "get his cattle through" the winter months. They present a problem to the veterinarian because of the variety of disorders caused by their inferior feeding qualities. Not only is it a problem to obtain these feeds because of their scarcity, but the rationing of these emergency feeds is in itself a problem.

The Russian Thistle

There is probably no one emergency feed more important, but about which so little is known as Russian thistle hay. Its utilization is an acute problem confronting many cattlemen in the plains area. Russian thistles make a good emergency hay for cattle if the weeds are cut and cured before the spines have hardened. It can be used also as ensilage. In both forms it has given good results when fed along with another roughage. Cattle do not relish it as the sole source of roughage and will not do well at first when fed thistles exclusively because it fails to satisfy their hunger.

Russian thistle ensilage usually has an undesirable odor; however, it is eaten, readily, by cattle, despite this short-coming. Because of its laxative action it is a good practice to give a non-laxative feed such as prairie hay, straw, or fodder in conjunction with it. The laxative action is due to the mineral salts content of the thistles. These salts cause animals to drink large quantities of water; otherwise no bad results have been reported.

When immature thistles in any form are fed as the only roughage, it is recommended that a grain supplement—one to three pounds daily—be fed. If grain is not available, linseed or cotton-seed cake should be fed at the rate of one pound per head daily.

Wheat straw, Russian thistle hay or ensilage and one to three pounds of ground grain make a good combination. Russian thistle hay, wheat and sargo ensilage produce excellent results when fed to mature cattle.

Russian thistle is high in protein although the percentage decreases as the plants mature. Hay made from thistles before the spines have formed or hardened, contains approximately 18 per cent protein, consequently no additional protein need be fed with such hay. Hay made from nearly mature thistles contains between 10 and 12 per cent protein and has

been fed fairly satisfactorily as the only roughage, without the addition of a protein supplement. The protein in mature thistles is less digestible than the protein in the immature thistle hay. Mature thistles are also lower than the immature plants in digestible carbohydrates; indicating the necessity for a supplement of some kind for the maintenance of stock cattle is increased when the plants are cut when mature. Russian thistles if allow to mature are very high in fiber content also.

Hay made from mature Russian thistle may have so many hard spines as to have but little feeding value. However, if one of the following methods of preparation be used, such hay will make a reasonably satisfactory emergency feed:

1. Moisten the hay 10 to 12 hours before feeding. (Water that has had from one-seventh to one-fourth Blackstraps molasses added to it may be used. This will soften the spines considerably.)

2. Grind the Russian thistle hay before feeding. (Any good roughage mill or feed mill is satisfactory for the grinding if the dry hay has first been run through a separator or combine.)

3. Cut or chop the hay and put in a silo. Four hundred to five hundred gallons of water should be added to each ton of dry, well-cured, mature, thistle hay.

Some emergency rations in which Russian thistles are used as feed for stock cows, are as follows:

1. Good quality immature Russian thistle hay, 18 to 20 pounds; ground grain, one to three pounds.

2. Immature Russian thistle ensilage, 40 to 50 pounds; ground grain, one to three pounds.

3. Medium quality, ground or moistened mature Russian thistle hay, 18 to 25 pounds; cottonseed or linseed cake, one pound; ground grain, one to two pounds.

4. Mature Russian thistle ensilage, 25 to 40 pounds; dry fodder, wheat straw, prairie hay or cottonseed hulls, 5 to 10 pounds; cottonseed or linseed cake, one pound; ground grain, one to two pounds.

In some sections of Kansas and surrounding states there was no green feed during the late summer or fall and no wheat pasture available during the entire winter. Cattle in these sections wintered on poor quality mature thistle hay, wheat straw, cottonseed hulls, or perhaps other low quality roughages in which there is a lack of green color, face the possibility of serious difficulties before green pasture is again available. This will be due to a lack of vitamin A in the ration. Supplementing these roughages with cottonseed meal will not prevent the trouble, for it also lacks vitamin A.

The manifestations of vitamin A deficiency are abortion, retained placenta, calf scours, emaciation and ophthalmia. Of course, these troubles may be present in a herd the ration for which contains vitamin A, but it is important that infectious abortion be not confused with trouble due to lack of vitamin A. To eliminate this, the herd should be tested for abortion and if the cattle are negative, and these symptoms have been present for several months, it will indicate that the ration is at fault. A limited amount of green alfalfa hay in the ration or any other roughage with green color present will eliminate this, or if fed after symptoms appear it will tend to correct the avitaminosis.

Corn and Sorghum Ensilage

In additon to Russian thistles, a large percentage of drought-stricken corn has been harvested. It, too, presents a problem to livestock men. Corn ensilage will probably vary more in quality this year than in normal years, not only in its feeding qualities, but also in bulkiness. If immature corn ensilage has kept well its feeding qualities compare favorably with normal corn ensilage.

Late sorghums, although they do not mature the grain, make excellent ensilage if properly handled. Sorghum ensilage, in general, is equal to corn ensilage. Both corn and sorghum ensilage are extremely low in protein; hence they should be sup-

plemented with high protein feeds. It is true that cattle have subsisted through the winter months upon ensilage alone; but the results are not satisfactory when measured by the condition of the cows and the size and vigor of the calf crop.

Cattle will subsist on what is generally regarded as poor ensilage. Sour, sloppy ensilage may be fed with best results by placing a layer of straw on the bottom of the bunk, to absorb the moisture, and then place the ensilage over it. Of great importance is the fact that cattle seem to relish this combination, for they eat it more readily than either of the foods, fed separately. However, it should not be inferred that spoiled ensilage is equal in feeding value to normal ensilage. Its feeding qualities are markedly lower. Because the condition of ensilage varies greatly, it is impractical to attempt to designate ensilage by grade, or even to estimate its momentary value without seeing it.

When supplemented with a protein concentrate and calcium, good ensilage is just as satisfactory as alfalfa hay for wintering cattle. Approximately three pounds of ensilage will replace one pound of alfalfa hay and should be regarded, on this basis, for efficiency in feeding.

Since sorghum and corn plants are low in calcium, it is advisable to feed one-tenth of a pound of finely ground limestone or bonemeal per head daily to cattle of all ages when ensilage or fodder is the only roughage fed.

Ensilage should be fed in approximately the following amounts per head daily to cattle of different ages: Mature cows, 40 to 50 pounds; yearlings, 30 pounds, and calves, 20 pounds. More than these amounts may be fed if the ensilage is available.

Wheat Straw

Wheat straw is another low protein roughage that can be used in an emergency ration. Headed straw is superior to long straw, and the finer and more chaffy the straw, the higher its feeding value. It is usually fed in conjunction with other roughages, but is satisfactory to cattle when fed as the only roughage. When fed alone, in order to prevent wasting, it is a good practice to sprinkle it with molasses diluted with water. This also increases its palatability.

Straw, like other feeds, varies greatly in quality; hence it is difficult to assign it to a definite value in relation to other feeds. Nevertheless, it is at least approximately correct to state that good quality wheat straw is worth three-fourths as much as good quality dry corn fodder.

Prairie Hay

Prairie hay is another low-protein roughage that has been fed to beef cattle in large amounts the past winter. Because most of the roughages available this year are low in protein, special attention should be given to protein supplements. Roughages low in protein are also low in calcium, so one-tenth of a pound of finely ground limestone per head daily should be included in most emergency cattle feeding rations. Prairie hay has a higher feeding value than wheat straw and, in a normal season, about the same value as choice sargo fodder. However, sargo is a better drought crop and in general it is superior to prairie hay this year.

Summer Grass Hay

In some sections, favored by early fall rains, various plants grew rapidly and in some instances were cut for hay. Crab grass, wild millet and sudan grass are good examples. Much of this hay is of excellent quality and all of it may be utilized in emergency rations. On the average, such hay will compare favorably with prairie hay in feeding value. Its protein value would depend somewhat on the stage of maturity at which it was cut, but in the main, these miscellaneous hays should be supplemented with a high protein.

Cottonseed Hulls

Cottonseed hulls, if available and not too high in price, may be used to good advan-

tage in emergency rations; however, one must not confuse it with cottonseed meal in regard to protein content for it is also a low protein ration and should be supplemented in the ration with protein. Good wheat straw contains two and one-half times as much digestible crude proteins as cottonseed hulls, and cottonseed hulls are hardly equal in feeding value to choice prairie hay, but probably is equal in feeding value to this year's drought stricken crop. Approximately the same amount of cottonseed hulls, prairie hay, wheat straw, or ground fodder must be fed in order to satisfy the roughage requirements of cattle of different ages. Cottonseed hulls should not be fed exclusively for longer than 90 days, because of the danger of producing amaurosis, paralysis and death in cattle of all ages.

Protein Supplements

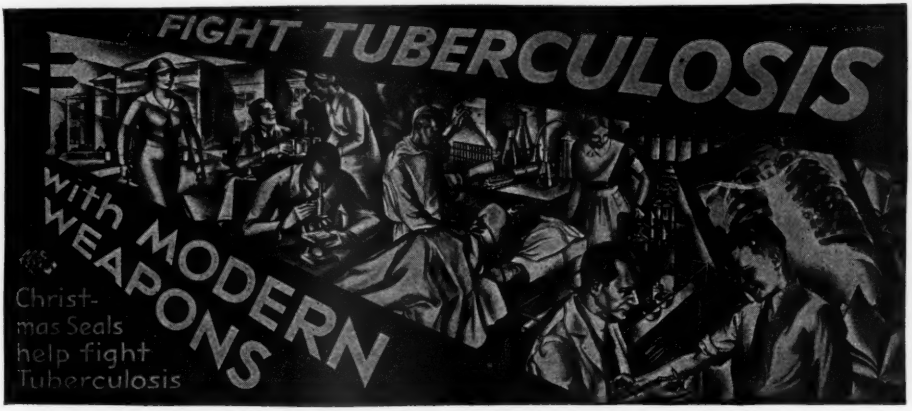
Although alfalfa hay is rich in protein it is too high priced to justify being used as a supplement. A less expensive substitute is one pound of linseed or cottonseed cake for four pounds of alfalfa hay. This substitution, however, does not avoid troubles due to lack of vitamin A in the diet, for which alfalfa, or other feed containing carotene, must be used.

Leghum hays may also be purchased for roughage, but most of them are too high in price to use in emergency rations. Low protein roughages plus a protein supplement seem to offer the cheapest and most satisfactory solution to feeding problems in drought areas.

Protein supplements vary in feeding value and price. Linseed and cottonseed meal are standard protein supplements with which most cattlemen are familiar; linseed meal has a considerably higher value than cottonseed meal, when it is used in fattening rations, but in wintering rations, these supplements are approximately equal in feeding value. Unless cottonseed meal can be purchased at 10 to 15 per cent less per ton than linseed meal, it pays to use linseed meal in the emergency ration.

Experiments have proved, that a mixture of two protein supplements may have a higher feeding value than either one, when alone, due to the fact that each supplies the amino acids that are lacking in the other.

In order to cover each feeder's specific problem in emergency feeding volumes would be necessary. All in all, maintaining cattle through the winter months following drought during previous growing periods is a serious and difficult problem.



"FIGHT TUBECULOSIS WITH MODERN WEAPONS"

The affiliated tuberculosis associations are conducting a campaign throughout the United States under this slogan. The campaign has in view popular education on the early danger signs of tuberculosis and the importance of early diagnosis and prompt treatment. This life-saving enterprise deserves every possible support.

The County Agent Question

By D. M. HOWARD,
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THERE are two sides to the misunderstandings that have been rife between the veterinarian and the county agricultural agent. It may be the means of overcoming some of the difficulties and increase the business of the veterinarian to set down for study some of the factors that have led up to the difficulties.

Training.—The veterinarian has been trained in the cause, symptoms, lesions and treatment of disease in animals; and in sanitation, isolation and immunization in the prevention and control of disease of animals. His training in genetics and nutrition has been more superficial than is desirable.

The county agent has been trained in farm procedures, genetics, feeding, housing, breeding, sanitation and care of livestock. His training in comparative anatomy and physiology and the symptoms of disease is so extremely superficial as to be without value in practical application, nor is it intended that it should be.

These constitute the majors in each course of study—veterinary and agricultural. There is overlapping in genetics, feeding, housing, sanitation and prevention of disease.

It is this overlapping in the two courses which leads to difficulties between the two fields, but which should be on the friendliest of terms and work together.

Outcropping of difficulties.—Generally speaking, there are about 10 per cent in both classes, or if you wish in all classes, who cannot get along with any one, not even with those in their own field. These men are trouble makers in any community and since all recognize this we will drop them from further discussion. There is little if anything that can be done about it anyhow—until we can give them a nice funeral.

There are men in both fields who are over-zealous in their work, and before realizing it, make statements which are wrong or overlap into the other field, never appreciating the adage, "Knowledge like wood should not be used until well seasoned." There are others who do not keep abreast of the times in their work, and still others who are deficient in training, either through the lack of opportunity, the lack of ability or lack of inclination to study. These men make snap judgments, get into things out of their field, make statements about which they know nothing or have insufficient information, all in an endeavor to cover up their lack of knowledge.

Specific faults of each.—The veterinarian who is called to a case of infectious disease after treating the case either does not give the farmer enough information about cleaning up the premises or lets it go with a statement of, "Better clean up and disinfect around here." The farmer is a member of the farm bureau. He goes to the county agent and asks him if he has any information on how to clean up and disinfect after such a disease. The agent gives the farmer a bulletin published by the U. S. D. A., which contains specific directions. The veterinarian could have done the same thing or written out the directions for the farmer. This results in overlapping and possibly trouble arises.

The county agent is hired by the county and wants to hold his job. He does everything he can to get in solid with the farmers and renders a lot of personal service. The agent observes what may be a case of colic and suggests a dose of salts. After looking around he finds some moldy feed, which was probably the cause of the trouble and suggests a change of feed. The agent got out of his field in the first case but was right the second time.

Perhaps a farmer calls him out to the farm giving no excuse for the call. The farmer may be a farm bureau member in good standing, a prospective member or a very influential farmer. After a discussion of things in general, probably legitimately

in the county agent's field, the farmer shows the agent a bunch of hogs and asks, "What is the trouble with them?" The agent suggests that he call the local veterinarian. The farmer may give any or all of the following replies:

"His charges are too high, more than the stock is worth." When times are good the veterinarian should increase his charges and when times are bad lower them.

"He will give me a bunch of high-sounding terms and end up by telling me that they are not worth treating and charge me $5.00 for a lot of words I can't understand." Talk the farmer's language; get his viewpoint and explain the case thoroughly to him.

"If I call him I know they will die, so it would be better to knock them in the head here and now." Keep abreast of the times, read professional magazines; attend veterinary meetings; find out what other veterinarians are using for cases you are having trouble with.

"Last time I called him he said he would be right out and it was the next day or the day after before he arrived." Be prompt. It saves many cases, prevents serious losses to the farmer and adds to your reputation. In areas where veterinarians are not so far apart, it saves the loss of clients.

"If they were your hogs, Agent, what would you do?" This is a difficult situation for the agent. From his training he may think he knows what to do. But by answering directly he will be invading the veterinarian's field.

So the county agent is often put on the spot and difficulties between the agent and the veterinarians arise unless they work with each other. There are countless similar instances unnecessary to mention. Those listed are examples of the other fellow's problems.

The following plan of procedure will alleviate conditions and, in the majority of cases, bring about a unity of purpose and a larger volume of business for the veterinarian.

The veterinarian should call upon the county agent and talk the matter over. If either or both belong to the 10% of misfits, not much will be accomplished—possibly that nice funeral may be hastened, by appoplexy of course, nothing violent. If either or both are of the class of incompetents, achievements probably will not be lasting. Provided both are of the type that can be reasonable and see the other fellow's viewpoint, i. e., belong to the majority in each group, many future misunderstandings will be avoided and mutual and reciprocal advantages will accrue. In some cases it may be more effective to build up a gradual acquaintance with the agent, dropping a hint here and there, eventually showing him some of the difficulties he may get into with the farmer. Offer to help on some project he is carrying; join the farm bureau; take an active part and attend the meetings.

Help to work out a county plan on livestock production and sanitation. An example is the McLean County swine sanitation program which was worked out by veterinarians and carried into effect largely by county agents.

The county agent contacts from 4,000 to 8,000 farmers in a year; being on friendly terms with him is the best kind of advertising and a good method of practice building.

Make a special rate to 4-H club members, they are the farmers of tomorrow, attend some of their meetings; they will call a veterinarian quicker than their dads will and likely through that contact, the farmer will give you more work.

County agents are more or less transients, staying in a county an average of less than four years. Veterinarians are more permanently located. When a new agent comes into the county, the veterinarian should be the first to welcome him, help him in every way. The people of the county will appreciate it; so will he. If he is the right sort, it will mean more business for the veterinarian. If he is the wrong sort, trouble is inevitable anyhow and the veterinarian will at least have the credit for trying to get along with him.

Many veterinarians now temporarily employed in B. A. I. work will be looking for new locations later. Soon there will be another class of graduates looking for locations in which to practice. Call on the county agent first. He will know a good

deal about veterinary practice in the county and he has no particular reason for not telling, as other practitioners may have. Seventy-five per cent or more of them assist a veterinarian calling under such circumstances and will try to help him get started. They are human. They will be getting reports on his work and if he measures up with the farmers, the sky is the limit in the agent's ability to boost him, because it takes a lot of poultry work, sanitation and general grief off his shoulders. Get acquainted; neither group is as black as it is painted.

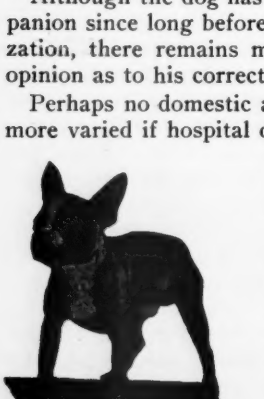
As a part of his work the agent is expected to write timely articles for the newspaper and send monthly news letters to the farm bureau members. This advertises the agent and a smart veterinarian can figure out ways of getting publicity through these articles and letters. Through state and national farm and home radio programs the county agent gets splendid publicity. Don't be too envious of it. It causes more to be expected of him and makes his task the harder. Veterinarians and their work are as a rule under-advertised, while the opposite is probably true of the county agents. The livestock owner needs both and they should supplement each other.

* * * *

Suggestions on Canine Diet

Although the dog has been man's companion since long before the era of civilization, there remains much diversity of opinion as to his correct diet.

Perhaps no domestic animal has a diet more varied if hospital observations may be taken as a criterion. Raw carrots, potato peelings, whole corn, peanuts, popcorn, watermelon seeds and other irritating and almost indigestible foods from man's own menu are frequently the cause of bringing this animal under the veterinarian's care.



Although the dog is primarily carnivorous, man attempts to convert him to his own diet. Thus a vegetarian's dog must be satisfied with a meatless diet, candy and sweets for the lap dog of milady, while the dog of the alleys contents himself with whatever he can find; much of it in various stages of decomposition.

From observations made while catering to the well and the unwell of our canine friends, the following hints on their diet are submitted:

1. Raw meat should form the basis of a dog's diet.
2. Milk should be included in the diet of growing puppies.
3. Carbohydrates should be well cooked.
4. Food idiosyncrasies are not uncommon. (Most Boston terriers cannot tolerate milk.)
5. Meat should include not only muscle but also viscera, glands and blood.
6. Some dogs have a preference for cooked meat.
7. Vary a dog's diet to avoid monotony.
8. Chicken bones are likely to splinter and cause trouble.
9. Large bones will occupy a dog's time, aid in erupting teeth, and afford a supply of calcium and phosphorus.
10. Toasted bread is easier to digest than untoasted.
11. Canned fish will often stimulate a sluggish appetite.
12. Horse meat is quite laxative if fed in large amounts to dogs unaccustomed to it; make the change gradually.
13. Beef broth should replace water in a case of gastroenteritis.
14. Cornflour made creamy with simmered milk is beneficial in acute enteritis.
15. A large percentage of moist eczema cases may be cleared up by a raw meat diet.
16. Liver, kidneys, lungs, egg yolk and cod liver oil are rich in the disease resisting vitamin A.
17. Meat, eggs and vegetables contain the fertility vitamin E.
18. Give cod liver oil for vitamin A and D.
19. Bitch's milk contains about three times as much protein and fat as cow's milk.
20. Cow's milk will about equal bitch's milk by the addition of one raw egg for each two ounces.
21. Meat in lumps stimulates the secretion of gastric juices, hence is more readily digested than when finely ground.
22. The ideal diet should contain protein, fats and carbohydrates in approximately the same proportions as in bitch's milk, i. e., 3-3-1.

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Manhattan, Kans. K. S. C., '35.

Laryngotracheitis in Young Chicks

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LARYNGOTRACHEITIS is a specific infectious disease, confined principally to chickens. It is caused by a filterable virus and characterized by gasping for breath. It is apparently increasing in prevalence in most of the important poultry producing states.

This disease was first observed among adult birds, particularly those in transit, feeding stations and markets. The disease appeared in epizootic form among young chickens in the middle west, in the spring of 1930, causing heavy loss to many breeders.

It was at first called "gasping disease" but was found on investigation to be the same as laryngotracheitis of adult birds. Bushnell and Brandly have reported a study of this outbreak in several hundred chickens from various sources. Some were contact cases, others were inoculated with cultures and filtrates.

The incubation period under field conditions is from two to ten days with an average of six days. The symptoms in chicks and mature birds are substantially the same. They consisted almost exclusively of manifestations of marked dyspnea, due to a collection of blood-stained mucous and cheesy, pseudo-membrane-like masses in the trachea. A cheesy plug often forms in the entrance to the trachea, causing suffocation of the affected bird. The birds observed by Bushnell and Brandly were continually gasping for air. The mouth, nostrils and eyes were usually free from inflammation. Occasionally the chicken developed a typical coryza. Affected birds usually eat little due to the fact they are unable to eat and gasp at the same time. If they are not badly affected they eat. In light attacks there is usually a period of gasping followed by recovery. Chicks exposed to cold air develop more serious and earlier gasping than those properly protected in the brooder. Some chicks develop moist rales and hoarseness although hoarse chirps may characterize any affected chicken.

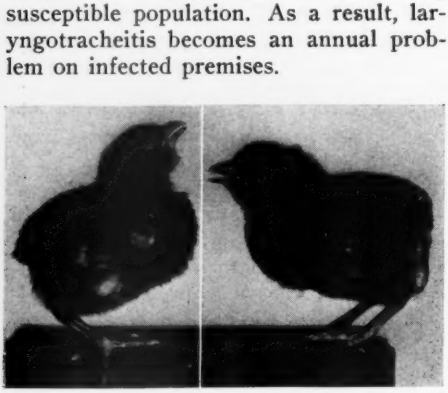
The post-mortem findings are confined largely to the respiratory tract with little pathological change in other tissues. The lungs are somewhat congested. Inflammatory products are poured into the alveolar space and as the disease progresses, the trachea is first filled with a thin yellowish mucous, which later becomes viscous and eventually caseous; frequently causing suffocation. When involvement of the lungs occurs, there are reddish-grey or greyish-yellow areas in them. Usually the earliest and severest involvement is of the posterior portion and periphery, which may indicate that the infection follows the main bronchi toward the opening into the air sacs.

No difficulty should be encountered in differentiating this disease from diseases commonly involving the head of the bird: rhinosinusitis, fowl pox, fowl cholera, streptococcus infection and vitamin A deficiency.

The mortality in laryngotracheitis, according to Hinshaw varies from nought to 49 per cent, 11 per cent being the average. Death occurs, in typical cases, about three to four days after the onset. Slight losses are incurred during the mild weather and severe losses during an outbreak in very cold weather. In one outbreak 47 per cent of the deaths occurred during the first five days of the attack and 92 per cent during the first 10 days. It has been demonstrated that laryngotracheitis reduces egg production greatly.

Eggs from pens containing carrier birds did not hatch as well as eggs from pens free of such birds. Contaminated premises carry the infection for a considerable time.

One of the problems of control lies in the development of the carriers among birds surviving an outbreak. Carriers transmit the disease to the succeeding susceptible population. As a result, laryngotracheitis becomes an annual problem on infected premises.



Laryngotracheitis in baby chicks.

Measures for the control of laryngotracheitis are, in general, the same as those for the control of diseases in other animals.

1. The elimination of carriers from the community.
2. Quarantine all flocks in which this trouble develops.
3. Hatching sanitation, cleaning and disinfecting between hatches.
4. Eliminate an important complicating factor, pullorum disease, from the breeding stock.
5. Immunize susceptible birds in an infected or endangered flock against natural infection by vaccination.

If properly carried out these factors should undoubtedly control the disease, as they would any other infectious disease.

A method of immunizing birds against natural infection by vaccination has been developed by Beaudette. Its use is recommended in the control of laryngotracheitis in chickens and pheasants. It is recommended:

1. On farms where previous outbreaks have occurred.
2. Where a flock is established in an infected area.
3. Where infection is present and there is danger of spread.
4. For susceptible flocks that are to be added to previously infected or exposed flocks, or for a susceptible flock to which known survivors of the infection are to be added.
5. For birds in a newly-established plant in a poultry colony where the disease is prevalent.

Vaccination of growing birds should be carried out at any time after they are six weeks of age. If birds of differing ages are to be vaccinated, it is well to delay the operation until the youngest have reached six weeks of age. The vaccination of all susceptible birds at the same time is desirable. The mortality following vaccination is generally two per cent in mature birds; much higher in younger birds. In case of emergency vaccination where there is an outbreak, it should be resorted to upon the occurrence of the first symptoms. The disease spreads rapidly among susceptible birds. The efficiency of emergency vaccination depends upon the speed with which immunity is developed. Four to nine days are required to establish immunity after vaccination; natural infection may spread to a considerable percentage of the flock within this period.

No special preparation for vaccinating is required, except to confine the birds to the house the night before so they will be available.

In vaccinating the chickens the operator should sit near the catching crate; place the bird between his legs with its head down and back to the left. With the thumb and index finger of left hand placed on either side of the vent (not above and below) evaginate the upper lip of the vent, to expose the cloacal mucous membrane. Then the vaccine is applied with a brush or swab held in the right hand. Rotate the brush with the bristles up against mucous membrane. In adult birds the brush may be brushed across the mucous membrane with a painting motion. Avoid contamination of the sur-

rounding area. The vaccinated bird may be turned loose on the range. Great care should be exercised to prevent contamination of the premises with the vaccine.

It should be emphasized that vaccinated flocks should be isolated from non-vaccinated groups. Five days following vaccinating, the fowls should be examined for "takes" by examining the mucous membrane of the cloaca. In a properly vaccinated bird there will be an inflammation of the mucous membrane of the cloaca. One hundred birds should be examined. If 95 or more show "takes," the vaccination may be considered successful. If the percentage exhibiting "takes" is less than 95, it is advisable to examine the entire flock and revaccinate all birds showing no reaction. Revaccination is easily accomplished by dipping the brush in the exudate of the lining of the cloaca of a bird showing a "take" and then using the brush to revaccinate the bird showing "no take."

Conclusion.—1. Laryngotracheitis is due to a filterable virus infection with severe involvement of the larynx, trachea, bronchi and lungs.

2. In some cases in chicks the symptoms are complicated by other diseases, as pullorum disease.

3. Symptoms and lesions in chicks are similar to those of adult birds and due to the same cause.

Control Measures.—1. Removal of the carriers from the community.

2. Disinfection and proper sanitation of surroundings and the hygienic production and handling of chicks.

3. Quarantine of infected premises until the disease has been eradicated.

4. Immunizing of birds against natural infection by vaccination.

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Testing the comparative efficacy of various disinfectants in sterilizing small amounts of finely divided avian fecal matter it was found that colloidal iodine was consistently able to penetrate small particles of fecal matter, and to kill embedded bacteria within one-half hour.—*Baby Chick News.*

The Live Stock Situation

Hogs have advanced to a top of over $9 in Chicago, the best price since 1930, and the Department of Agriculture expects further advances later, though the usual Spring decline may intervene. The January slaughter was the smallest for the month since 1911. That a genuine scarcity of hogs and hog products is in prospect is unquestionable. On January 1 the number of hogs on farms was the smallest in fifty years, only 37,000,000, according to the Department's report, compared with 57,200,000 one year earlier and 61,320,000 on January 1, 1933, the peak of recent years. The Department estimates that the number of sows to farrow this Spring will be 17 per cent smaller than last year, which with an equal number of pigs saved per litter would give a Spring pig crop of 32,000,000. Thus the total number of hogs to supply both breeding stocks and slaughter this year may be placed at 69,000,000, whereas the usual slaughter is between 70,000,000 and 80,000,000, excluding deaths on farms. The estimate of the Department is that slaughter supplies up to September 3 will be 40 to 45 per cent smaller than last year.

The number of cattle on farms January 1 was 60,700,000, a reduction of 7,300,000 during the year, which is much the largest decrease ever made in one year. The number of milk cows was 1,000,000 less than a year earlier and with dairymen feeding 20 per cent less concentrates the production of milk per cow has been nearly the lowest on record. Prices of milk for city distribution are 10 to 15 per cent higher. Butter stocks February 1 were down to 18,000,000 pounds and still decreasing, and production in recent weeks has run around 15 per cent below last year. Prices early in the month were the highest in five years, and are high enough to attract a fair volume of imports.

Farm flocks of poultry have been reduced due to the cost of feed. Egg production consequently is smaller. Prices of dairy products and eggs usually decline in the Spring, but evidently the drop this year should be less than usual.—The National City Bank.

Fowl Paralysis

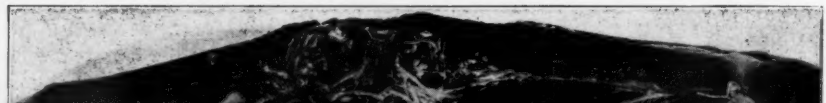
So-called fowl paralysis is rapidly becoming an important factor to the poultry man. The disease is also known as neuritis in chickens, range paralysis, and neurolymphomatosis gallinarum. There are many similar forms of fowl paralysis, but this one is a disease entity.

Bushnell and Brandly report a steady increase of this disease in Kansas. They describe a tumor formation, and a nerve involvement type being of equal prevalence. Staining processes reveal the same reactions in both types. The macroscopic lesions are readily seen. They consist of a fairly large tumor with a heavy leucocytic infiltration of characteristic color and appearance, or the sciatic and brachial nerves may show a thickened, lumpy condition throughout the course with a distinct yellowish color. The contrast of the yellowish tinge with the pearly white, smooth nerves that are normal, is quite noticeable. There may be tumors along with change in color and the fowl may be affected with paralysis in any degree.

usually persists. If hand fed they may live for weeks. The drooping of one or both wings is also quite characteristic. Ordinarily a general paralysis sets in after a varying period. Iritis is a fairly common symptom. There may, or may not be diarrhea.

Some observers attribute these symptoms to a heavy parasitic infestation or a lack of proper diet. However, in a true case, no amount of diet correction or intensive feeding will effect a cure. The bird may, or may not be infested, with parasites. No worming will ordinarily effect a cure, although it may increase the resistance of the bird. One or two birds of a flock, all on the same diet and subject to the same parasite contacts, may come down with the disease. If they be removed promptly no other cases may develop. Certain breeds seem more susceptible than others.

Transmission of the disease is easily affected under field conditions. Heredity is thought to be a factor in its development. Either resistance or susceptibility is quite definitely built up. A flock suffering yearly losses from this ailment



Range Paralysis
Right Ischiatic and Lumbar Nerves and Right Lumbar Ganglion (Enlarged).

Not all outbreaks present the same clinical features. Lameness in one or both legs is fairly characteristic. The general healthy appearance of the birds

new strain procured. The incubation period is at least four or five months. Laboratory inoculation is possible but should be marketed for slaughter and a

not altogether successful. The greatest number of "takes" has been from grinding the affected nerve tissue and injecting it intravenously. The causative agent is thought to be a neurotropic virus.

Treatment of the disease is not satisfactory. It consists principally of building up the general health of the flock—sanitary measures and correct diet. Isolate affected birds immediately. They may be treated symptomatically, but should not be turned back into the flock even though they recover. If possible, remove all the birds from contaminated grounds. Some birds that have never shown any clinical symptoms of the disease, present lesions on autopsy. Fresh green lettuce is, without doubt, of great benefit in the diet. Yeast is recommended, as is skim milk instead of water. Chicks should be reared on clean ground, away from mature fowls. New stock should be removed as far as possible from a flock in which the disease has occurred or vice-versa, if they have never been affected. Quarantine all accessions to the flock. Disinfect all pens and houses at regular intervals, and **do not overcrowd.** Cement runs are best for cleaning; soil runs should be turned and saturated with a suitable disinfectant at regular and relatively short intervals.

To summarize:

1. Fowl paralysis exists as a specific disease, and can be diagnosed by a study of clinical evidence, post mortem lesions, and histological sections of various tissues.

2. It is more readily diagnosed as an outbreak than by the examination of a single affected bird.

3. It seems certain that the disease may be transmitted through the eggs or by contact between diseased and healthy birds.

4. No agent has as yet been found in the tissues by cultural or staining methods with sufficient consistency to acquire significance.

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Internal Parasites of the Dog

A KNOWLEDGE of parasitology is of utmost importance to the small animal practitioner of today. Few realize the havoc parasites cause and the complications that ensue in pathological conditions as a result of heavy parasitisms. One of the essential instruments of a small animal hospital is a microscope. It is essential because of the necessity for it in the diagnosis of the kind of parasites with which the animal is infested.

The principal internal parasites of the dog are the helminth worms; the majority of the important species of which, as adults, inhabit the small intestine in the dog. The most important of these are the two species of Ascarids, *Toxascaris leonina (Ascaris marginata)* and *Toxocara canis (Belascaris canis).*

Ascarids

The roundworms of the dog have a life history similar to that of other Ascarids. The eggs are voided with feces and develop to the embryo stage externally. Embryonated eggs ingested by the host free the embryos in the intestine. The embryos migrate principally to the lungs, where the larval stage develops. When mature, the larvae are coughed up and swallowed and develop the mature worm in the intestine. As adults they may produce discomfort. By migrating into the stomach, they may cause vomiting or even convulsions. However, the most important effects are not caused by the adults, but by the larvae. In some cases, pups are infested in utero. The eggs hatch out in the intestines of the bitch and migrate in the usual manner through the intestinal wall. Instead of passing from the lungs to the trachea, they return to the systemic circulation, reaching the uterus, migrate into the liver and lungs of the fetus, remaining there until the puppy is born. About five days after the puppy is born, they descend into the intestine to complete their develop-

ment in the normal manner. Such accumulation of larvae may cause the death of the puppy before, during or immediately after birth. It has been found that in such instances, the bitch usually has no adult worms in the intestines, all the larvae she had taken in having passed to the fetuses. This prenatal infestation is more often seen in the case of *Belascaris canis* than with other species.

Treatment.—Oil of chenopodium is, of course, the treatment of choice for Ascarids. The margin of safety with this remedy is not large and the dose needs to be determined with care. Weigh the animal—don't guess at its weight; and measure the drug carefully—again, don't guess. The dose is 0.1cc per kilogram of body weight, or 1cc for a 22-pound dog.

A brisk cathartic of castor oil is essential after the administration of the oil of chenopodium. It is required not only to prevent absorption of the chenopodium, which is very poisonous, but also to prevent the Ascarids from accumulating in knots and obstructing the intestines.

Tetrachlorethylene also is effective against roundworms in the dog, but not so highly effective as is oil of chenopodium. It is somewhat safer, and is to be preferred for cats. The dose is 1cc per pound of body weight. All fat should be withheld from the diet for three to four days before tetrachlorethylene is given and it should be followed in about one hour by a saline purgative. Its use instead of oil of chenopodium is probably justified in weak animals. As are all other anthelmintics, save perhaps santonin, it is contra-indicated in cases of enteritis.

Hexylresorcinol is fairly effective for the removal of roundworms from dogs. However, it is expensive and furthermore, requires a complete fast of 36 hours before it is given. It is too toxic for cats.

Hookworms

The parasites found in the small intestine of dogs, next in importance to Ascarids, are hookworms, of which there are three species, *Uncinaria stenocephala, Ancylostoma braziliense* and *Acylostoma caninum.* The eggs from mature worms are voided in the feces and develop to the larval stage in the soil. Dogs may be infested by swallowing the larvae or by invasions through the skin.

These worms are tissue feeders. Their digestive glands secrete an anti-coagulant that often permits considerable loss of blood from the tissues on which they are feeding. Some authorities have estimated that one hundred worms will take from the host one pint of blood every 24 hours. There is little doubt that this loss of blood accounts for the anemia which accompanies heavy infestations of hookworms. Hemorrhages from the intestinal tract may be noted in advanced cases, and death ensues unless successful treatment is instituted promptly. With the microscope, the eggs of the adult can be detected, easily, in the feces.

Treatment.—Tetrachlorethylene is the treatment of choice for the removal of hookworms from dogs. The dose is 0.2cc per kilogram of body weight, or 2cc for a 22-pound dog; which should be followed immediately by a saline purgative to prevent absorption and also, if Ascarids are present, to prevent them from knotting and obstructing the intestines, since this agent is almost as effective in the removal of Ascarids as oil of chenopodium.

Carbon tetrachloride is also effective for the removal of hookworms. The dose is 50 per cent larger than for the tetrachlorethylene. It is, however, far more damaging to the liver and animals treated with it, should be on a fat-free diet for several days and permitted no oil at the time of treatment. It is essential that it be followed by a saline cathartic.

The injury in hookworm infestation is primarily due to loss of blood, and after the worms are removed, the animal should be put on an iron and copper treatment—three grains a day of a mixture of iron citrate, 100 parts; copper sulphate, one part.

Tapeworms

Among the commonest parasites of the small intestine are the tapeworms. There are several species of these that infest the dog, all of which require an intermediate host in their life cycle. *Dipylidium canin-*

ium is the most common and the *Taenia pisiformis* ranks next in prevalence.

Tapeworms produce digestive disturbances of various sorts in the dog, and well-marked nervous disturbances, which, in some cases, simulate rabies. The gravid segments cause anal itching and irritation in their passage. The eggs of the adult may also be found in fecal examinations with the aid of the microscope. However, the diagnosis is usually made by finding segments of the worms in the feces.

A tapeworm of importance in the United States because of its public health aspect, is the *Diphylobothrium latum*. This tapeworm is often called the broad tapeworm. It can be recognized by its centrally located genital pore, which may be regarded as in the medial line. It also occurs in man and requires two successive intermediate hosts, a fresh water crustacean and a fresh water fish.

The most important of all tapeworms of the dog is the *Echinococcus*. This genus probably contains several species, the most important being the *E. granulosus*. Owing to its small size, it is seldom seen, except in the larval stage, hydatid cysts, which are only too common. This parasite is particularly cosmopolitan; hydatid cyst infesting all species of mammals from man to the marsupials. It is of great economic importance, since it infests all domestic animals. It also causes a dangerous and even fatal disease of man.

Treatment.—Satisfactory taeniacides for use in the dog are limited to three drugs, arecoline, kamala and oleo resin of male fern, and none of these are entirely satisfactory for the *Dipylidium* species, which often has its head deeply buried in the mucosa.

Of the agents for removing tapeworms from dogs, arecoline appears to be the best. However, it is more poisonous than was formerly thought and is not safe for puppies or for aged dogs. It is contra-indicated in enteritis, as for that matter is kamala and the oleoresin of male fern also.

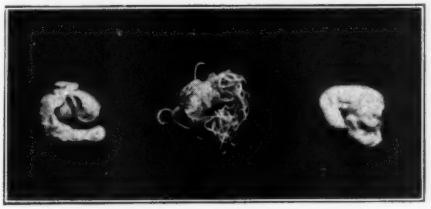
The dose of arecoline should probably not exceed one-half grain; male fern may be given in doses of one-half to one dram, and kamala, in one-half to one and one-half dram doses.

It is best to withhold all feed for 24 hours before attempting the removal of tapeworms and to give a saline purgative at the beginning of this period of starvation. It is not necessary to give a cathartic following the administration of arecoline or kamala, but a dose of castor oil should be given after the administration of male fern.

Whipworms

Whipworms are common parasites of the large intestine. The species of most importance in the dog is the *Trichuris vulpis*. Some practitioners regard whipworms as of little importance, but there is ample evidence to the contrary. The presence of this worm is detected by finding the lemon-shaped eggs in the feces.

Whipworms, like the hookworms, are blood suckers; their normal habitat being



Three ceca removed because of parasite infestation.

the cecum. The symptoms of their presence are somewhat like those of the *Uncinariasis*. Alopecia or spotty baldness is considered by some, as a symptom of whipworm infestation.

Treatment.—The difficulty in the removal of whipworms is due to their inaccessible location—the cecum. The classic treatment is santonin, one-fourth to one grain with a small dose of calomel, daily for ten days. It is probable that one dose would be sufficient if it contacted the parasites, but ordinarily repeated doses are necessary to effect this contact, and even then they may fail. Some have reported good results from passing a catheter per rectum, forward to the opening of the cecum, and injecting tetrachlorethylene, but as in the case of giving

santonin by the mouth, this injection often fails to enter the cecum and hence is ineffective, although in skilled hands it is more reliable than santonin by the mouth.

Theobald has recently reported success in the removal of whipworms by opening the abdominal cavity and injecting a fine suspension of santonin (one to two grains in glycerine and water), directly into the cecum by means of a hypodermic syringe. This appears to be a solution of the problem of treatment for trichuriasis in dogs. The operation is a simple one, probably involving little more hardship to the patient than the fasting and ten-day treatment with santonin and calomel administered orally. If further experience justifies the preliminary report it may largely supplant the radical operation of cecectomy, which is too grave for routine use.

Flukes

The *Fasciola hepatica* is primarily a fluke of ruminants, but is sometimes found in all domestic animals, man and some wild animals. The *Fasciola buski,* a fluke of man and swine, may also be found in the dog occasionally. The liver is the favorite site for the development of flukes. There are not many cases recorded in dogs. The condition occurs where dogs consume a quantity of fish.

Treatment.—Carbon tetrachloride is a very effective treatment for flukes in ruminants and would probably be effective also in the dog.

Trachea Worms

Trachea worms of dogs, *Oslerus osleri,* have been found in some localities, but there is little known about them. Heavy infestations interfere with breathing.

Treatment. — Only treatment supportive of the patient can be recommended.

Lungworms

Lungworms of dogs, *Haemostrongylus vasorum,* are usually not diagnosed until postmortem examination. The adult worm lives in the heart and ramifications of the pulmonary artery. Respiratory disturbances occur in some cases, and there may be some development of ascites. The attacks of respiratory difficulty may disappear after a few days or they may lead to asphyxia and death.

Treatment.—No effective treatment is known for these parasites.

Filariasis

The only important helminth in the blood stream of the dog is the *Dirofilaria immitis,* which is more common in the southern part of the United States than elsewhere, although of recent years occasional cases have been observed in the northern states. A few cases have been admitted to the small animal clinic of the Kansas State College.

Except in extreme cases, there is no sign of their presence until the dog is exercised, when it tires easily. The larvae inhabit the peripheral blood stream. The vectors are various species of mosquitoes. These larvae may be found in a sample of blood by microscopic examination.

Treatment.—Antimony has long been used for the treatment of blood parasites. There are two proprietary antimony preparations on the market for the treatment of heartworm in dogs, Filsol and Fuadin. Of the former, but one dose is required; of the latter, repeated doses. Experiments carried on by Wright and associates, Bureau of Animal Industry, indicated that Fuadin is a safer remedy than Filsol.

Animals not too severely infested, recover spontaneously in about five months, if reinfestation is prevented, all strenuous exercise avoided, the patient is well fed and otherwise well cared for.

In conclusion, may I stress that canine parasitisms are bringing to the small animal practitioner an increase in practice. Parasites once confined to certain sections and states are now disseminated over the entire United States, largely as a result of transportation of dogs in private automobiles. The situation is not amenable to control by regulatory officials.

With a working knowledge of parasitology, the use of the microscope and familiarity with modern treatment, the small animal practitioner can render a most valuable service to his community in the treatment of parasitic infestations of dogs.

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Drugs Used in Veterinary Medicine

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V. SANTONICA—the Source of Santonin

History.—Santonica, known in commerce as Levant wormseed, is a remedy which seems to have stood well the test of time. The ancient Greeks used it somewhat like we do to this very day. Several species of "wormseed" are mentioned by Dioscorides, who explains that "seeds" were prepared with honey and used by the populace as a remedy for Ascarids. From the sixth century to the present day, it received great commendation for its efficacy against intestinal worms in children. Not many drugs can boast of such a constant and secure career. From its empirical use in the home the modern practitioner has learned to take advantage of its anthelmintic qualities.

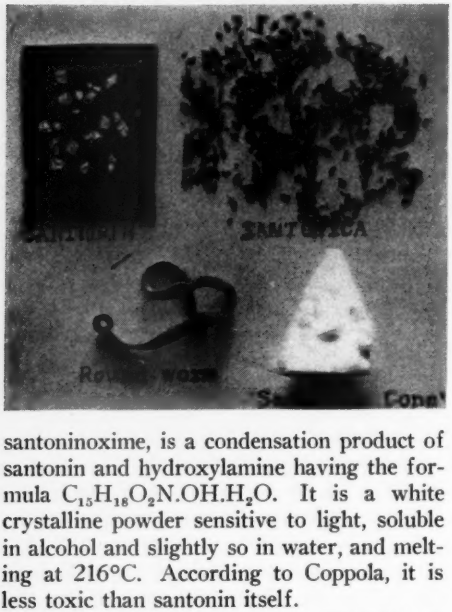
Source.—The crude drug consists of the unexpanded flower heads of various species of Artemisia (*A. pauciflora, A. maritima,* and *A. cina*) which are in the composite family of plants. These are low, hairy, aromatic shrubs bearing drooping flower heads, each of which consists of a small, greenish-brown, elongated but oval body about ⅛ inch in length. Their appearance resembles small "seeds" and have, at the same time, a slight resemblance to small worms, for which reason they are called "wormseeds." Upon microscopic examination, the heads are found to consist of fifteen to eighteen overlapping scales which contain oil glands. The latter give the drug a strong aromatic odor. The taste is bitter and camphoraceous. The plants are widely distributed throughout Europe and Asia, and are especially abundant in the salt marshes of Turkestan (in Russia) where the flower heads are collected and extracted for their santonin content. In their native land the plants are employed (as is absinthe) as an aromatic bitter. This drug should not be confused with "American wormseed" which comes from the fruit of Chenopodium ambroisioides which is native to the United States and Central America. The two can be distinguished readily since that when the chaff is removed, the "American" type yields a tiny black seed whereas in the "Levant" type the chaff consists of scales without any seeds remaining behind. Furthermore, Chenopodium yields a volatile oil which contains ascaridol, whereas Artemisia is the only source of santonin.

Properties.—Santonica itself was officially recognized in the U. S. P. from 1860 until 1900, but has since been replaced by its derivative santonin which was first isolated in 1830. The crude drug contains from 2 to 3 per cent of volatile oil and from 1.5 to 3 per cent santonin. The latter represents the active portion of the crude drug and is extracted as follows:

The santonica is mixed with slaked lime and then dried and ground. This alkaline powdered mixture is now percolated with warm alcohol, after which the alcohol is allowed to evaporate. At this point the residue is acidulated with acetic acid, and the mixture stands for several days when the crystals of santonin are collected and purified by treating with more alcohol and charcoal. This crystalline substance is a ketone, known technically as the inner anhydride (lactone) of santoninic acid. It has the composition, $C_{15}H_{18}O_3$. It is found in the drug market as a white crystalline powder or colorless crystals of glistening, rhombic prisms that become yellow on exposure to light. This color change does not appear to affect its activity. It is odorless and at first tasteless, though afterward it becomes bitter. It is practically insoluble in water, but dissolves readily in alcohol and chloroform, but less so in ether. It dissolves quite readily in alkaline solutions, but these also increase its bitterness. Its melting point is 170°C. (338°F.).

Preparations.—Santonin is manufactured in the form of tablets, compound tablets containing calomel, troches and compound troches, and the "santonin cones" so familiar to children and which resemble a confection

in appearance and taste because of the sugary diluent that is used in them. Chromosantonin or golden santonin is santonin which has been altered by the effects of light giving it the yellow color already mentioned. Calcium santoninate is a white, insoluble powder which resembles santonin in properties. Santoninoxim, also known as chromo-



santoninoxime, is a condensation product of santonin and hydroxylamine having the formula $C_{15}H_{18}O_2N.OH.H_2O$. It is a white crystalline powder sensitive to light, soluble in alcohol and slightly so in water, and melting at 216°C. According to Coppola, it is less toxic than santonin itself.

Action.—Santonica is not employed to any extent today because it is not as certain or efficacious or convenient to use as is santonin. The latter is about 30 times more active than the crude drug, so that ½ grain is the equivalent of 15 grains of santonica. Santonin itself does not affect the host when used in therapeutic doses for its anthelmintic effects. Because of its slight solubility, the drug is but slowly absorbed from the digestive tract, where it forms sodium santoninate. Much of the santonin is excreted from the system unchanged, particularly in the feces; and that part which is changed in the system is converted to oxysantonins. The small amounts excreted in the urine of animals, gives it a distinct yellowish tinge which becomes pinkish or reddish in the presence of alkalies or even when exposed to air for some time. The feces are also colored similarly in most cases. When large or toxic doses are administered the vision is affected and in the end convulsions which resemble those produced by strychnine may ensue.

Therapeutics.—Santonin is primarily used for its effects upon round worms, and also its action on whip worms. When administered as a vermifuge, absorption must be avoided as far as possible since it is a very active systemic poison. The drug must therefore be given in conjunction with a good purgative such as calomel. Some authorities recommend castor oil as the purge believing that oils (contrary to popular belief) inhibit absorption and therefore lessen the chances of poisoning. The medication is continued for several days and then discontinued for an equal period after which dosing is again resumed for a like period. The parasites seem to be irritated by the drug and to relax their hold upon the mucous membrane of the small intestine. They are thus driven into the large intestine and from here are expelled by the action of the purgative which should always accompany santonin. When the worms are studied soon after expulsion, they do not appear to be much affected since they are still active unless exposed to extreme temperature changes. The irritant action is probably due to specific effects on the worm's muscle fibers since this occurs with isolated muscle strips also. It is only fair to state that the action is not altogether understood since direct action on these pests outside the body does not prove lethal. The drug is used chiefly upon dogs, cats and hogs being given on an empty stomach and followed afterward by a cathartic even though a purge might be given along with it. In the early stages of Trichina it has also been found effective in hogs. Hall, Price and Wright state that the use of this drug for ascarids in dogs is usually safe and has special value when there is inflammation of the digestive tract. According to these authorities it should be given in the morning, three hours before feeding every day for five or six days in doses of ¼ to 1 grain, according to the size of the animal, and accompanied by equal quantities of calomel. Whipworms offer a problem for removal, because of the difficulty of getting the drug

in contact with these pests. At the present writing, the usual method of ridding the animal of these worms is by repeated doses of the santonin. Equal amounts of santonin and calomel (doses of ¼-1gr. according to size of animal) are given in the morning, and this is kept up for a week, suspended for a week and then resumed for another week. Instead of this three-week method of treatment, an alternate method is to keep up dosing daily (as in the 3-week method) and continue as long as whipworm eggs appear in the feces on microscopic examination. The treatment should then be suspended to see whether or not eggs reappear in the feces. If repeated examinations are negative the success of the treatment is proved. Theobald reports complete success in ridding dogs of whipworms by giving a single large dose, 1 to 3 grains, suspended in glycerine and injected directly into the cecum by means of a hypodermic syringe.

Santonin does not work effectively against tapeworms or hookworms. Even in therapeutic doses, interference with vision in which color confusion occurs may exist as is described under toxicology below.

DOSE TABLE

	Metric	*Apoth.*
SANTONIN—Dogs (Ac. size)	.015- .2	gr. ¼—iii
Cats and Fowl	.02 - .06	gr. 1/3—i
Hogs	.5 -1.	gr. viii-xv
Sheep and Goats ....1.	-2.	gr. xv-xxx

For larger animals the price is too high to make the use of this drug popular. The recommended dose for hoses and cattle is: 10gm-25gm (drams ii½ to vi¼).

Toxicology.—When santonin is absorbed to any great extent the symptoms of poisoning soon follow, but sometimes the drug is eliminated from the body rather slowly and for this reason there is a cumulative action. Accordingly, it should be noted carefully that poisoning may occur when small amounts are administered over an extended period or when larger doses are prescribed without proper catharsis. The symptoms occurring in the mammal are best described from observations on dogs, prominent amongst which are a unilateral twitching of the head muscles, rolling of the eyes, grinding of the teeth, regular epileptiform convulsions in which the animal is thrown into an opisthotonos condition and later into clonic spasms of the larger musculature. It is the convlusive state which has caused some to mistake it for strychnine poisoning. Sometimes there is nausea and vomiting, and marked salivation and there may be mydriasis, feeble pulse, labored breathing and often a fatal asphyxia. There appears to be a special influence upon the sense of sight, producing a xanthopsia (yellow vision) which is at times followed by partial or complete blindness. Sometimes, the blindness in the animal is temporary and lasts for a week or more. Often, the senses of smell, taste and hearing are also involved. Occasionally, the temperature is elevated, and there may be perspiration. The visual effects appear to be due to peripheral action, but the convulsive stage is principally due to a stimulation of the cortex. A peculiar contraction of the muscles occurs in between the spasms and is due to an increased activity in the area between the medulla and cerebral peduncles. The medulla is little affected by the poisoning as is evidenced by the return to a normal rate of respiration in between spasms. The circulation is interrupted by asphyxia, and the heart beats long after respiration ceases.

The treatment consists of emptying the bowels by means of emetics and purgatives, preferably using epsom salt. An enema of chloral hydrate may be used to advantage to counteract the convulsions, or inhalation of some anesthetic such as ether or chloroform will aid in lessening these. Cold affusions and artificial respiration may be found necessary. The central stimulation must be handled with care, and everything must be done to avoid collapse. Recently, as in strychnine poisoning, the barbituric acid derivatives have been found to be efficient antidotes during the violent stages.

If it be remembered that santonin is an active anthelmintic that can readily poison if improper doses are administered, and that it must always be accompanied by an effective purgative to avoid its absorption and accumulation in the system, deleterious results should not ensue with the average animal.

Abstracts

Virus Activity Ruled by Host Cell*

When a filterable virus invades a living cell and starts its disease-causing activities, it apparently enters into a very close relationship with its involuntary host. For the rate of activity of the virus depends to a large extent on the rate at which the cell is conducting its own life activities.

This was among the points discussed in a recent address on these strange invisible disease-causing agents by Dr. R. Manninger, director of the State Institute of Veterinary Hygiene at Budapest, Hungary, before the Twelfth International Veterinary Congress in New York. These filterable viruses can not be seen with any microscope and can pass through the pores of a fine porcelain filter. However, since it has been recently discovered that many quite familiar, microscopically visible bacteria have the power of "dissolving" themselves into an invisible, filter-passing phase, Dr. Manninger suggested that the name "filterable virus" has lost its original significance, and he proposed instead the name "ultravirus" for the permanently invisible, filter-passing agents of disease.

At the same meeting, Dr. F. Gerlach, director of the State Institute for Animal Hygiene at Mödling, Austria, called attention to the seemingly greater activity by these viruses in provoking living tissue to form defensive "anti-bodies" of the nature of anti-toxins. These anti-viruses, he said, are formed more certainly, and confer longer and stronger immunity on animals recovering from virus diseases, than is the case with the corresponding process in animals recovering from bacterial diseases. The reason for this phenomenon, he added, is still quite unknown.

Although the filterable viruses, or ultraviruses, have been known for a long time as the causes of a great variety of plant and animal sicknesses, their real nature is still in doubt. In some respects they act like non-living enzymes or digestive ferments, in others, like genuinely living organs. For this reason the non-committal name "virus-enzymes" has been proposed for them.

COMMENT: The foregoing is one of many references to the scientific work of the Twelfth International Veterinary Congress that has attracted considerable attention.

* * * *

Diseases of the Bursa Fabricii

Statistics collected at the Institute for contagious animal diseases at the University of Leipzig,[56] Germany, covering the first ten years following its founding, demonstrated that approximately 0.1% of the chickens autopsied exhibited lesions of the bursa of Fabricius.

Two chickens which had died of pleuroperitonitis, revealed that the infection had its origin in the bursa Fabricii, which was filled with caseous exudate and fecal matter; the walls of the bursa were found to be necrotic. An acute diptheritic bursitis was also discovered in four pigeons. Five chickens presented enlarged bursae with thickened and reddened walls; the lumen was filled with yellowish-grey, stratified, rather firm concretions; hemorrhage was sometimes present. These concretions do not possess any pathognomonic significance, they were accidental findings and would probably have been diagnosed more often, had a special search been made for them always.

Nine chickens exhibited tumors of the bursae Fabricii. Their specific diagnosis was sarcoma mixtocellulare and globocellulare. The histological structure of the tumors showed great similarity to that of sarcoma of the ovaries. These tumors are of clinical importance because their presence is apt to interfere with defecation and egg laying.

Eber calls attention to the following disease conditions of the bursa Fabricii, mentioned in the literature: Hydrops bursae Fabricii, eversion of the bursa, invasion of the bursa by intestinal parasites.

*Reprint from *Science News Letter*, October 6, 1934, p. 219.

[56]Eber, A. 1934. Die durch Obduktion feststellbaren Geflügelkrankheiten. *M. & H. Schaper*, Hannover.

Cause of Follicular Mange

A survey of the recent literature reveals that the eitology of demodectic mange is just as much veiled today as is the therapy uncertain. The cause of the disease was formerly considered to be the mite, and later the staphylococcus. Accordingly, therapeutic action was directed first against the one and then the other one. Today the principal question is the one of condition, while the search for the final cause, that is, of all the factors which are supposed to change the harmless parasite into a harmful offender, is of secondary importance. The ultimate cause was summed up to be the excitant, and the first visible symptom, that is, the sudden numerical increase of the parasites, and the damage done by them upon the skin, was considered to be the immediate consequence of the excitant. One spoke about the nature of the disease, and in order to make the nature plausible, one explained the irregularity in susceptibility of dogs to the disease as being due to a predisposition, but by which means this predisposition was brought about, remained an open question. The negative results of attempts at artificial transmission were considered unequivocal proof that the demodectic mite is powerless against the healthy animal skin.

In either artificial or natural transmission, I am under the impression that the mite is not sufficiently equipped to tackle the highly keratinized skin of older dogs. Hence, the well known failures. Dogs over three months of age had always been used for transmission, while it would have been proper to select the new-born, or nursing puppies.

There are four facts which did not find sufficient consideration in the study of the process of mite invasion. First, the destruction within the follicles, wrought by the mites, for which reason the mite will have to be considered in the future the cause of mange without question. Second, the emigration of the mite described first by Scheben in 1903. Third, the mite invasion, that is, the recognition that the mite emigrates to young dogs. This takes place mostly from the mother to the nursing puppy or in the kennel within the first weeks of life. In some cases it may occur later. One of the most significant signs of demodectic mange is the absolute preference of invasion of young dogs, according to Reichart. Fourth, the influences of drugs upon the healthy and upon the mange-diseased skin.

Heller, Heydt and Schönberg agree that the demodectic mite attacks the canine skin and wedges itself between hair and hair-sheath; gradually it penetrates into the depth, destroying the inner root sheath. This causes a considerable loosening of the hair. As a result of multiplying, the mites require more space and cause an ever widening separation between hair and hair sheath. Finally, the hair becomes entirely loosened from its epithelial lining. The mites penetrate to the hairbulb and the final separation between hairbulb and hair papilla is accomplished. The result is a falling out of hair. The mites are found in large numbers not only on the hairless areas, but also on those places in which clinical symptoms are really moderate, and on areas of the body which macroscopically do not show any lesions. The picture of the skin disease is dominated by the great enlargement of the follicles and the hyperkeratosis. The hairs exhibit all the stages of degeneration. Splitting of the hair shafts may be noticed. Often, the hair is loosened from its sheath and a connection exists only at the point of contact between the papilla and the hairbulb. The follicle is filled with a conglomeration of horny masses and detritus in which numerous mites may be found embedded. The horny masses are the remains of the cornified follicular epithelium. This process of cornification can be traced to the activity of the mites, (their activity exerts a strong stimulus upon the epithelial cells of the external root-sheath) and partly to the follicular pressure produced by the masses of scales and mites; the result is a degenerative cornification of the epithelial cells.

Scheben's work in 1903, referring to the emigration of the mite, failed to receive

[57]Horneck, K., 1935. Thirty-Six Jahre Demodex-Bekampfung beim Hund—Thirty-Six Years of Warfare against Demodectic Mange. *Tierarztl. Rundschau*, 41:3, pp. 33-38.

proper attention in subsequent literature. Considering the reputed low mortality of the mite and the rarity of direct transmission, it was generally believed that the mite could not easily migrate and it was openly asserted that in both forms of the skin disease the mites do not leave their seat either in the hair follicles or in the sebaceous glands. Scheben observed in his case that one minute after the application of a 4½% aqueous solution of silver nitrate the mites would start active movements and begin to emigrate. The head is seen to move in all directions; the maxillae are moved now singly, now in pairs. The legs are seen to move in various directions, giving the impression as if the mite were about to swim. Forward movement is particularly promoted by the powerful contraction of the abdomen, producing a peculiar jerking motion. With increase of temperature the movements become more active and energetic. With a fall in temperature, the movements become retarded and finally cease.

Various invstigators considered the mite as harmless and thought it to be present everywhere in nature. Against this view is the fact that there are numerous kennels in which the demodectic mite has never been observed during decades of breeding.

There is no question that the disease is spread solely from dog to dog, that is, from dam to puppy. The occurrence of mites upon the healthy skin has been disproved, completely. Experience has shown that a special disposition for the invasion of the demodectic mite is to be assumed.

Based upon the conviction that the invasion starts from the mother, one of my clients, in whose kennel demodectic mange was present for thirty years, was instructed ten years ago to treat the puppies, when they were five to six weeks old, every week for four consecutive weeks, with a mange cure. Every Sunday, the dogs were checked minutely, and every suspected skin area was treated. None of the animals so treated developed mange.

Mention must be made that the lethal effect of parasiticides upon mites under the microscope has no relationship to the curative value of such parasiticides.

Summary.—Demodectic mange possesses two phases. One phase is macroscopically invisible, but can be detected microscopically. The other phase is macroscopically visible. The demodectic mange mite is the primary cause of demodectic mange, and not a harmless parasite. The pustular form is a complication of the squamous form with secondary staphylococcic infection. The immigration of the mite is dependent upon the condition of the dog. The spread of the mite and of the mange is always slow, except in the case of mass invasion of four weeks old puppies. The so-called rapid spread of demodectic mange is merely the change from the macroscopically invisible form to the macroscopically visible form. The mite causes destruction in the hair follicles during immigration as well as during occupation and emigration. The present view that the mites do not leave their seat in the follicles and in the sebaceous glands is erroneous. The mites emigrate from their seat whenever they are disturbed. Disturbance may originate either outside or inside the body. The speed with which the mite emigrates depends on the degree of stimulus exerted upon the mite by the disturbance. Emigration of the mite is conducive to falling out of hair. The so-called ultimate cause, the excitant which changes the harmless mite into the destructive parasite, is merely the factor responsible for the disturbance and emigration of the mites.

Since it is known that the mites emigrate, the so-called local treatment is inadequate. The efficiency and concentration of a remedial agent must be ascertained empirically. Nonspecific external remedies possess a harmful effect upon the skin eruption. Applying mange ointment over the entire unclipped surface of the dogs' body and repeating this procedure twice or thrice, will reveal the degree and extent of demodectic mange. Treatment of five- to eight-week-old puppies will prevent the occurrence or spread of the disease at that age. In future, exposed puppies are to be protected against demodectic mange immediately after birth.

Fowl Paralysis a Filterable Virus Disease

Research[58] on 248 fowl of ages varying between several days to one year, brought the following conclusions:

1. The experiments show clearly that the etiologic factor is an ultramicroscopic virus and not a cellular element.
2. The virus acts on the brain, the spinal cord, and the peripheral nervous system.
3. The principal symptoms depend, not upon the central nervous system, but upon nervous lesions in the various organs.
4. The virus may provoke a cellular hyperplasia simulating tumor in various organs, notably the ovaries.
5. Lesions of the iris are often observed.
6. In acute cases, lymphocytosis is the rule.
7. The virus can remain latent in the tissues for several months, whereupon occasional factors bring about an attack, or its presence can be manifested by symptoms which pass unrecognized. The virus can be transmitted from the eggs to chicks at birth, or to young chickens by cohabitation. On the other hand, it can progress rapidly and leave but rare lesions of the brain, spinal cord and ganglia.
8. The period of incubation is more than two months.
9. Natural infection occurs through the eggs or by way of the intestinal mucous membrane. It appears that the feces are infective during the period of incubation.
10. Natural infection appears during the first months of life and the susceptibility decreases after the age of six months.
11. The attacks attain their maximum between the third and sixth months of life.
12. Artificial infections can be provoked up to the age of one year.
13. Various factors, such as unfavorable conditions of raising and parasitism activate the invasion of the tissues by the virus.
14. Often the introduction of young roosters into a flock intoxicates all future offspring.
15. If the breeding flock is exempt and all risk of contamination by contact is avoided, methods of producing active immunity of the young, although yet imperfect, improve the chances of preventing the disease.

[58]Seagar. Pathologie de la paralysie des volailles (Pathology of Fowl Paralysis). *Rev. Vet. et Journ. de Med. Vet.*, 76: Oct., 1934, page 575-576. Abs. *The Vet. Jour.*, Oct., 1933.

Intoxications and Hypocalcemia

In recent years a series of nervous syndromes have been observed[59] in veterinary clinical work, especially among cattle and swine. They comprise such entities as milk fever, atypical milk fever, railroad sickness, grass tetany . . . and also unknowns which affect the nervous system and skeleton in one way or another. Sometimes these affections, especially in swine, appear to be related to rickets. They often strike the best animals of the herd. The conditions affect chiefly animals in extremely good condition. Those receiving average care and rationing are generally exempt. Poor ones are never affected.

While admitted generally that these diseases are related to calcium deficiency, is it not strange that it occurs only in animals receiving an amplitude of feed and of the calcium it contains. Such syndromes do not exist in association with real rickets, although rickets has its nervous phases. The curing of them with calcium gluconate is accomplished by correcting the disequilibrium of metabolism. It is a symptomatic treatment. It corrects an intoxication due to a qualitative excess of the ration—to an overworked nutrition, engendering a humoral disorder.

✓ ✓ ✓ ✓

The *27%* increase in horse colts foaled in 1934, over 1933, is an indication that farmers are awake to the situation. Still more colts will be foaled in 1935, but at least three years more will elapse before the birth rate will equal the death rate, and an increase in total horses and mules begin. Prices on both horses and mules, therefore, may be expected to advance, gradually, until 1940.

✓ ✓ ✓ ✓

[59]Lamay, E. Intoxications et Hypocalcémie (Intoxications and Hypocalcemia). *Recueil de Médecine Vétérinaire, d'Alfort*, 61:1, Jan., 1935.

ARMY VETERINARY SERVICE
Regular Army

Captain Herbert M. Cox is relieved from duty at Plattsburg Barracks, N. Y., effective at such time as will enable him to proceed to New York, N. Y., and sail on the transport scheduled to leave that port on or about June 6, 1935, for the Panama Canal Department, for assignment to duty with the Medical Department.

Major Philip H. Riedel is assigned to duty at Ft. Sam Houston, Texas, upon completion of his present tour of foreign service in the Panama Canal Department.

Each of the following named officers of the Veterinary Corps is relieved from further assignment and duty at the station specified after his name, effective in time to comply with this order, and will proceed to Washington, D. C., and report to the commanding general, Army Medical Center, on or about August 28, 1935, for duty, for the purpose of pursuing a course of instruction at the Army Veterinary School.

Lt. Col. Daniel B. Leininger, Presidio, Monterey, Calif.

Lt. Col. Isaac O. Gladish, Fort Bragg, N. C.

Major Kenneth E. Buffin, Ft. Sam Houston, Tex.

Major Fred W. Shinn, Ft. McIntosh, Tex.

Lt. Col. Jean R. Underwood is relieved from further assignment and duty at Ft. Bliss, Texas, effective in time to proceed to San Francisco, Calif., and sail on the transport scheduled to leave that port for New York, N. Y., on or about April 20, 1935; upon arrival in New York will proceed to Washington, D. C., and report to the commanding general Army Medical Center for duty.

Major Oness H. Dixon, Jr., is relieved from assignment and duty with the Chicago quartermaster depot, Chicago, Ill., effective at such time as will enable him to comply with this order, and will report not later than August 20, 1935, to the commandant of the Quartermaster Corps Subsistence School, Chicago, Ill., for duty as a student in the 1935-1936 course.

Major George L. Caldwell is relieved from duty at Fort Riley, Kans., effective at such time as will enable him to proceed to Chicago, Ill., and report not later than August 20, 1935, to the commandant of the Quartermaster Corps Subsistence School for duty as a student in the 1935-1936 course.

Captain John L. Owens is relieved from further assignment and duty as student, Quartermaster Corps Subsistence School, Chicago, Ill., effective upon completion of his present course of instruction, and will then report to the commandant, that school, for duty as instructor.

Major Sherman R. Ingram having been examined for promotion by a board of officers and found physically disqualified for the duties of a lieutenant colonel of the Veterinary Corps, by reason of disability incident to the service, his retirement by the President from active service as a lieutenant colonel under the provisions of the act of Congress approved April 23, 1908, and the act of Congress approved April 23, 1930, was announced to become effective March 31, 1935, with rank from March 1, 1935, the date upon which he would have been promoted to that grade by reason of length of commissioned service if found qualified.

Veterinary Reserve Corps

New Acceptances:

Cleaver, Fred Everett, Capt., 20 E. Main St., Avon, N. Y.

Lee, Chester Daniel, 1st Lt., 1120 Harding Ave., Ames, Iowa.

Ludloff, Otto Walter, 2nd Lt., 1321 Palolo Ave., Honolulu, T. H.

Foote, Bernard Eugene, 2nd Lt., 3-4 State War Memorial Bldg., Nashville, Tenn.

Mims, Jos. Bryan, 2nd Lt., 500 W. Henderson St., Cleburne, Tex.

Active Duty for Reserve Corps Veterinary Officers

The War Department contemplates calling to active duty, with their own consent, for periods of six months or longer, one hundred or more veterinary reserve officers in the grades of second lieutenant, first lieutenant, and captain, for service with the Civilian Conservation Corps. These veterinarians must be qualified in meat and dairy inspection.

Reserve officers when assigned to active duty in the army draw the pay of their grades which, with allowances for this detail, are:

Second Lieutenant—$183.00 per month.
First Lieutenant—$246.00 per month.
Captain—$316.00 per month.

If the officer has dependents he draws $18 additional; five per cent of the base pay additional also for each three years of active, or each six years of reserve service in the army in commissioned grades prior to July 1, 1932. For travel, and food inspection, for CCC camps involves much travel, he draws 8c per mile.

The assignments will be for six months with a prospect for an additional six months' duty if services are satisfactory and a strong possibility for continuance for two years or longer.

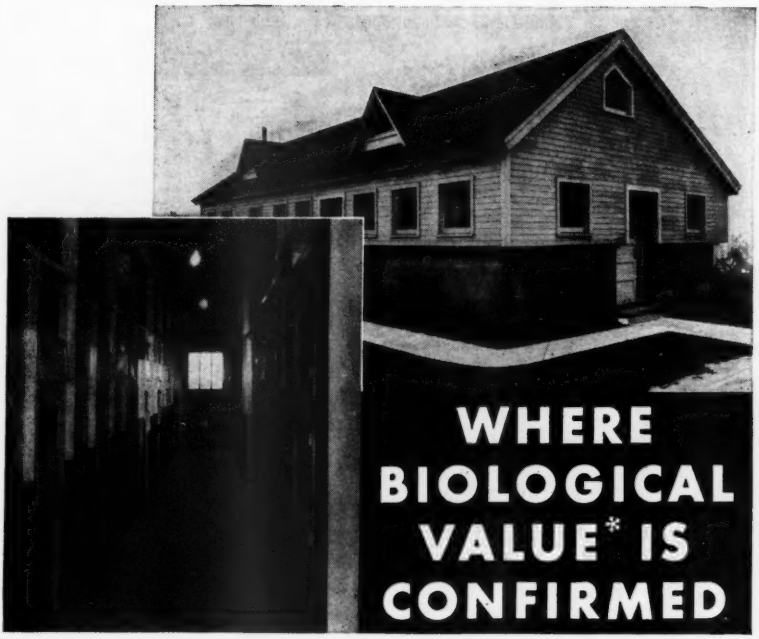
Examination for Appointment in the Veterinary Corps, Regular Army

An examination of applicants for appointment as second lieutenants, Veterinary Corps, Regular Army, under the provisions of AR 605-20, will be held within the continental limits of the United States from July 8 to 13, 1935, inclusive.

Application blanks, Form No. 62, A. G. O., may be obtained from the Adjutant General or the Surgeon General, U. S. Army, Washington, D. C., or from the Commanding Officer or Surgeon of any military post or station, and when completed should be forwarded direct to the Adjutant General, U. S. Army, Washington, D. C.

The applicant must be a male citizen of the United States between the ages of 21 and 29-9/12 years, and a graduate of a recognized veterinary college.

Applications received after June 25, 1935, will not be considered.



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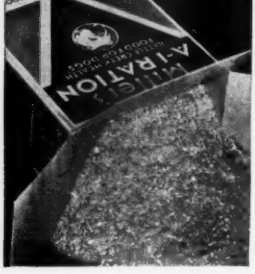

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CARATONE DOG HEALTH INSURANCE

The annual meeting of the Pacific North West Veterinary Association will be held at Victoria, British Columbia, July 8, 9 and 10. This association comprises veterinarians of British Columbia, Washington and Oregon. For full particulars, address the secretary, W. Graham Gillam, Cloverdale, B. C.

TWO-THIRDS OF U. S. COUNTIES ABOUT FREE OF BOVINE TUBERCULOSIS

Two-thirds of all the counties in the United States are now practically free of bovine tuberculosis. Since 1917, when the work began, infection among cattle has been reduced to a minimum in 2,035 counties, or 66.3 per cent of all the counties. The work has extended also to Alaska, the Hawaiian Islands, and Puerto Rico.

There are now 18 states in all that have been officially designated as modified accredited areas, signifying that the incidence of tuberculosis among cattle has been reduced to less than one-half of one per cent. There are also several states in which there are only a few counties that do not qualify as modified accredited areas. Recently the work has been progressing at the rate of more than 1,500,000 tuberculin tests a month. In February, 1935, 2,201,315 tuberculin tests were applied to cattle in this nation-wide campaign to eradicate bovine tuberculosis.

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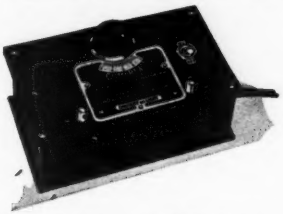

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ANOTHER EASTERN IOWA CLINIC

The Eastern Iowa Veterinary Association will hold its Fifth Annual Practitioners Clinic June 18, 1935, at the Dr. F. M. Wilson sales barn, Mechanicsville, Iowa.

E. H. Agnew of Waterman, Illinois, died March 17th, at New Albany, Mississippi, following an emergency operation. Doctor Agnew had practiced for many years at Waterman, but recently accepted an appointment with the B. A. I. to do tuberculin testing at New Albany, Mississippi. Doctor Agnew was a World War veteran and was given a military funeral. He is survived by his widow and five children.

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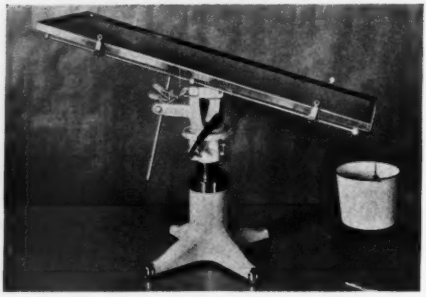

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The next state board examination for a license in practice in the State of Nebraska will be given on June 24-25, 1935, at the State House, Lincoln. All applications should be on file not later than 15 days prior to the date of examination. For further information, address the Bureau of Examining Boards, State House, Lincoln, Nebraska.

ALTON CHOSEN HEAD OF MANITOBA VETERINARY BODY

Gathered together from all parts of the province, members of the Veterinary Association of Manitoba, meeting in Winnipeg, February 8, 1935, heard papers on the problems of their profession and elected officers for the ensuing year.

A. L. Alton of Portage la Prairie was elected president, succeeding R. H. Lay of Winnipeg. Others elected were: H. R. McEwan, Stonewall, vice-president; William Hilton, Winnipeg, secretary-treasurer. These three officers were made the board of examiners. W. A. Hilliard, Vancouver, and J. F. Fisher, Brandon, were elected honorary members of the association. The following members were elected to the council: Lay, Alton, McEwen, Hilton, Fisher, J. A. Martin, Sperling, A. Savage of the University of Manitoba.

Addresses were made by Hon. D. G. McKenzie, Minister of Agriculture; Doctor McEwan on "Assistants in Practice"; Prof. J. M.

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THE FIGHT AGAINST SCREW WORM

April 15 must be the deadline this year in the Southeast for all farm and range practices that leave open wounds on livestock. Otherwise a repetition of the screw worm disaster of 1934 is inevitable, according to Dr. F. C. Bishopp, of the U. S. Department of Agriculture, who is in charge of the Division of Insects Affecting Man and Animals, Bureau of Entomology and Plant Quarantine. There is every reason to believe that the Southeastern States face another screw worm outbreak, perhaps more widespread than in 1934.

Among the main causes of screw worm attack are breeding animals so that the young are born in the fly season, and castrating, de-

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horning, docking, or marking at a time the wounds are sure to be visited by the screw worm fly. By regulating breeding so that the young animals will have plenty of time to recover from man-made injuries before flies become abundant—after April 15—many losses can be prevented.

LOUISIANA VETERINARY CONFERENCE

The fourth annual short course for the Louisiana Veterinary Medical Association was held March 6-7, 1935, in the Dalrymple Memorial Building at Louisiana State University. This short course was made possible by Dean J. G. Lee, Jr., of the school of agriculture. This year Dr. E. P. Flower, Secretary of Louisiana Livestock Sanitary Board, and Mr. Clyde Ingram of the University Poultry Department, also contributed.

There was a splendid attendance. Dr. James Monroe Smith, President of the University, gave an address of welcome and the response was given by Dr. J. A. Goodwin of New Iberia. President Smith paid high tribute to the late Dr. Harry Morris, who was associated with the university for more than twenty years. This was followed by an address by

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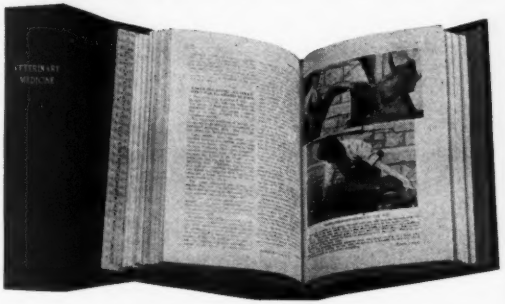

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Vaccination of calves, heifers and negative reacting young cows, by the use of properly prepared vaccine, according to outstanding practitioners, has been a means of controlling Bang's disease in infected herds and preventing its occurrence in non-infected herds.

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H. H. Baur, president of the association.

Very interesting and instructive were the talks given by our guest speakers: C. H. Covault of Iowa State College, Ames, Iowa; F. D. Patterson of Alabama Polytechnic Institute, Auburn, Alabama; and T. A. Sigler of Greencastle, Indiana.

Dean J. G. Lee, Jr., of the School of Agriculture personally welcomed the group the second day. He gave a very interesting talk on the general agricultural situation, the functions and the results obtained to date by the various governmental agricultural agencies. This talk was very enlightening to the practitioners.

On the evening of the 6th about 40 attended the banquet at the Heidelberg Hotel.

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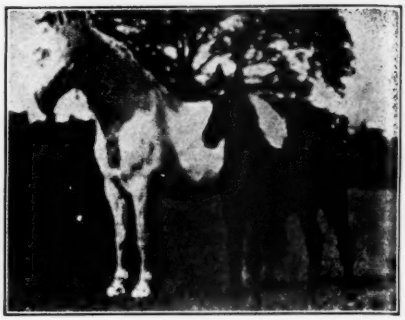

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